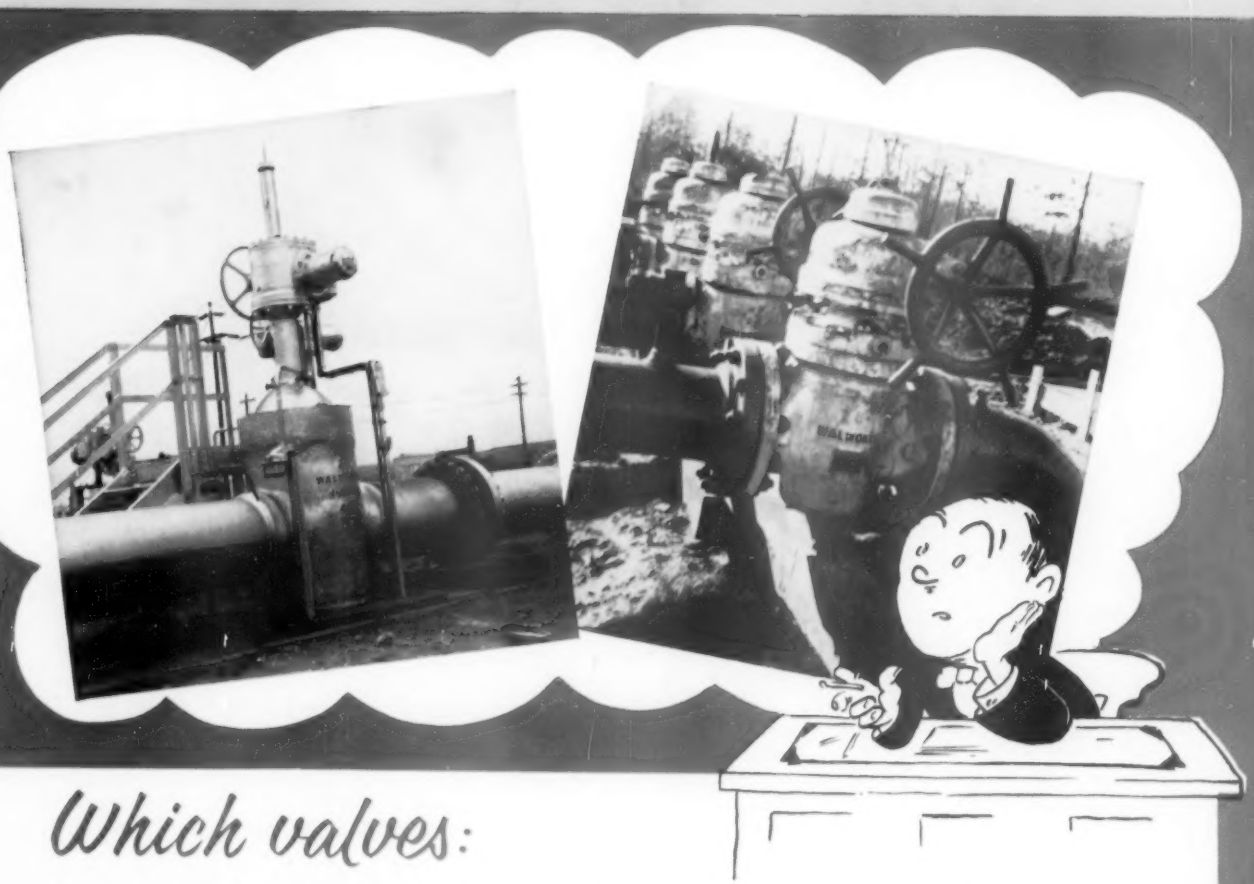
the OIL AND GAS JOURNAL



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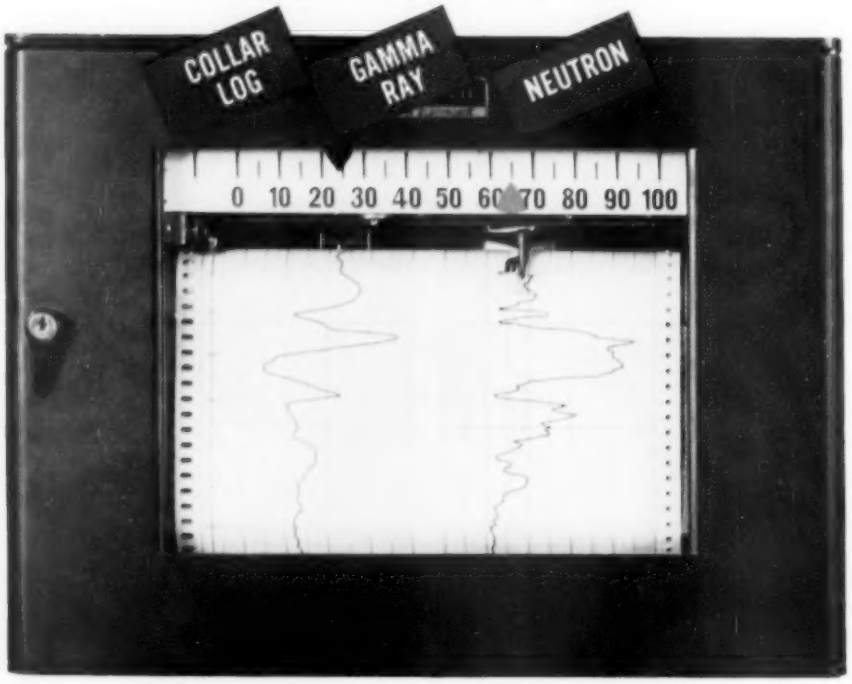

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In Brief . . .

1. ECONOMICAL COMMUNICATION . . . High initial costs and low channel utilization may make the construction of a microwave system unattractive unless two or more companies split building and operating costs. Keystone Pipe Line Co. and Sinclair Pipe Line Co. have established a jointly-operated system across Pennsylvania to serve the needs of both companies in that area. Both companies enjoy inherent advantages of private microwave operations for approximately 60 per cent of the cost of independent systems.

2. PREVENTING FAILURES . . . Failures in cementing big pipe prove expensive and prolong the completion of the well. One of the most common failures is channeling inside the casing. This can be prevented by running one plug ahead of the cement and another behind it. Channeling outside the pipe can be prevented by using centralizers. Pipe parting can be reduced by the use of wall-cleaning devices and centralizers placed on the bottom few joints of casing. Pumping the pipe up the hole can be prevented by starting the pump slowly, by circulating and cleaning the hole before removing the drill pipe, and by breaking circulation before reaching bottom of the casing.

3. LESS CONTAMINATION . . . The use of two processes will substantially reduce the chemical pollution of streams experienced by many refiners. These processes provide simple and economical solutions to the chemical treating problem. Regeneration of spent caustics can be accomplished by external atomic-oxygen oxidation utilizing the Rippie electric process. The amine salt-H_2S process can be used to extract hydrogen sulfide from hydrocarbon streams.

4. CONSERVATION EFFORT . . . When the Paradis gasoline plant was placed on stream near New Orleans recently, The Texas Co. completed a major conservation project for the utilization of oil-well gas from almost inaccessible locations in South Louisiana bays and marshes. Five compressor stations, two of which are submersible-barge type, handle the field gas. Eighty-eight miles of trunk lines bring the gas as much as 50 miles to the gasoline plant. Lean gas is used as feed stock for two petrochemical plants.

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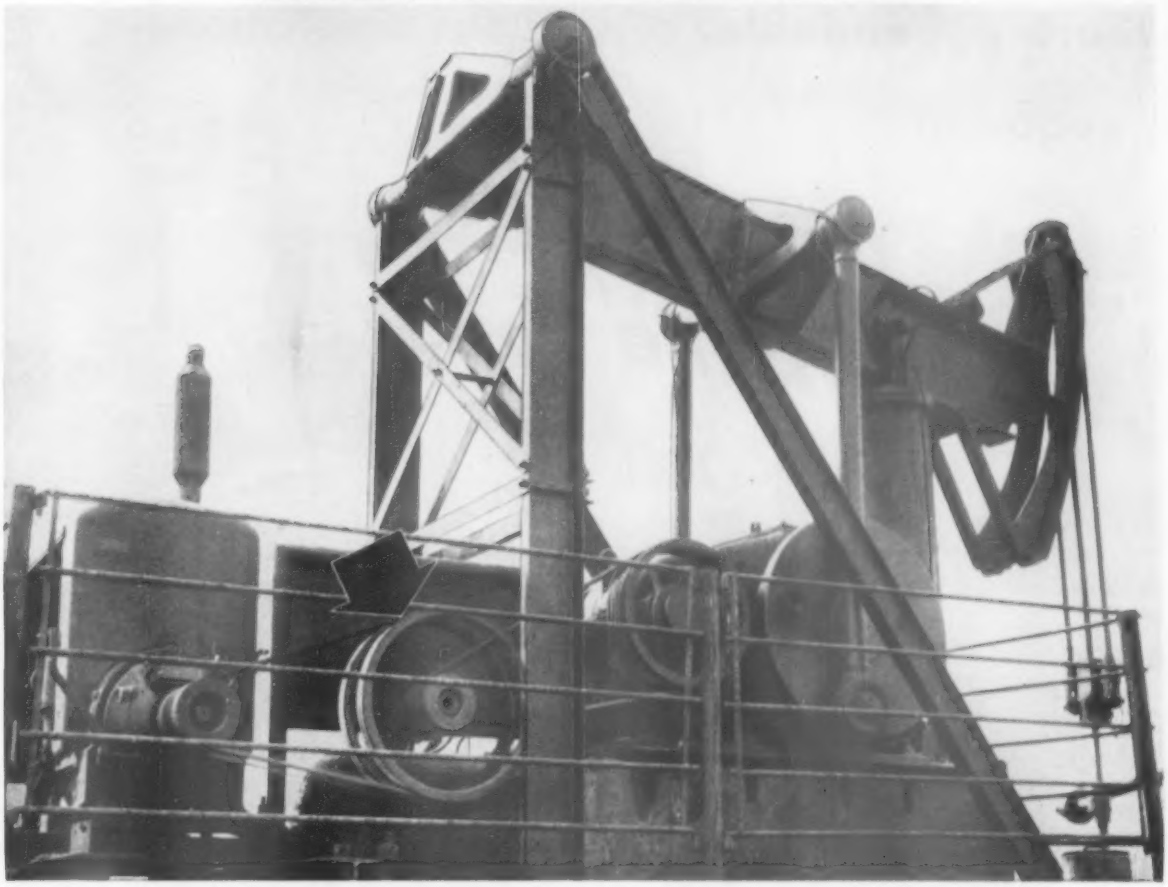

Belt service tripled with B. F. Goodrich Grommet belts

Grommet V belts last longer; cost no more than ordinary belts

WHEN ordinary belts were used to run that oil pump, they wore out in six weeks or less—some lasted only 3 days! They couldn't take exposure to weather, oil, or stand the weight of the 160-pound floating pulley (see arrow). The well is a "sander", so when the pump stops working, the whole pumping mechanism has to be pulled from the 3000-foot well, cleaned, and put back.

The oil company tested practically every make of V belt, but none solved the problem until they tried a set of B. F. Goodrich Grommet belts. Instead of giving just 3 days' or 6 weeks' service, the Grommet V belts were still on the job after *six months*, still going strong. B. F. Goodrich belts are now used almost exclusively on this oil lease. Here's why Grommet belts outlast and outperform other V belts:

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If you're getting short service from your belts, try a set of the longer-lasting Grommet belts, and see the difference. You'll find these BFG V belts at leading supply houses in the oil field, or at any one of these B. F. Goodrich warehouses: Dallas, Hobbs, Houston, Odessa, Wichita Falls, Great Bend, New Orleans, Oklahoma City, Tulsa, Williston, Denver and Los Angeles. *The B. F. Goodrich Company, Dept. M-337, Akron 18, Ohio.*

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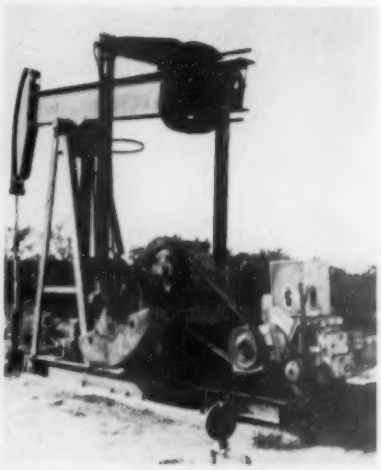
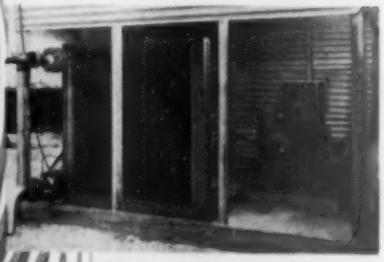
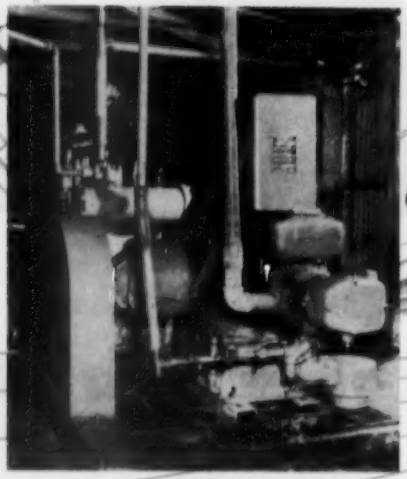


Operating Pumping Units



Operating Compressor Cooling Unit Fans



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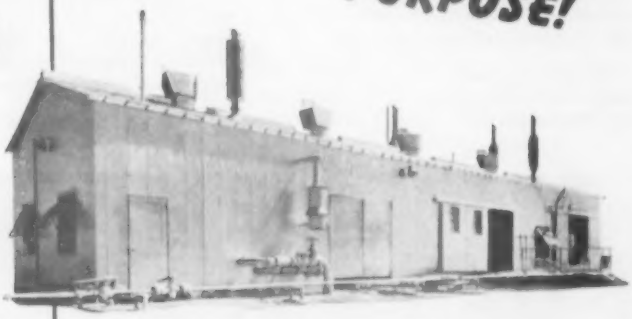

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New drawworks has more horsepower

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Timken bearings hold housings and shafts concentric, make closures more effective. Dirt and moisture are kept out, lubricant is kept in. Maintenance and lubrication costs are negligible.

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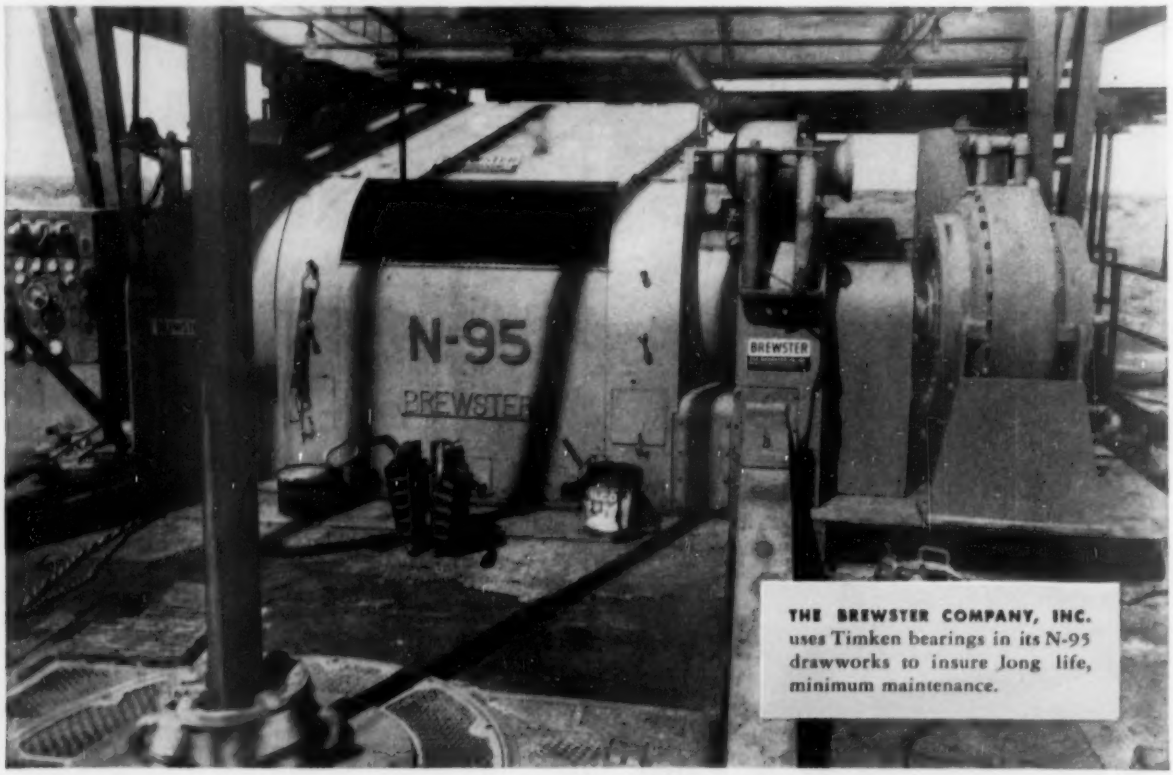
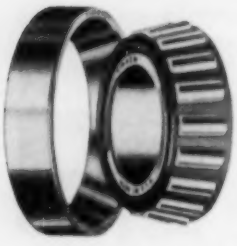
This symbol on a product means its bearings are the best.



THE BREWSTER COMPANY, INC. uses Timken bearings in its N-95 drawworks to insure long life, minimum maintenance.



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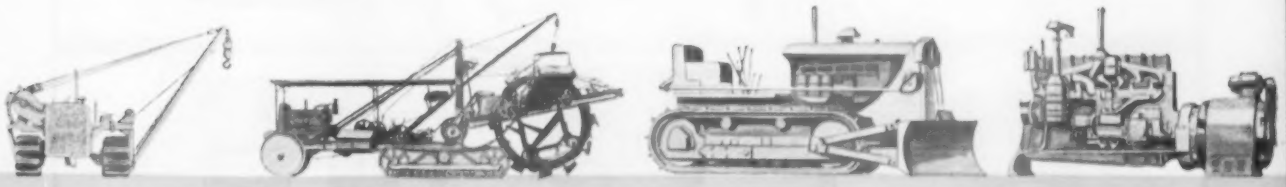

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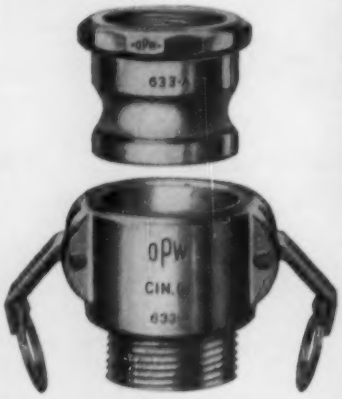

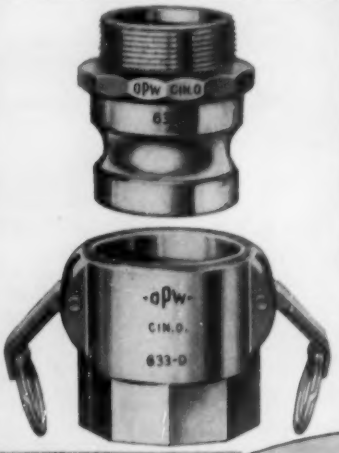

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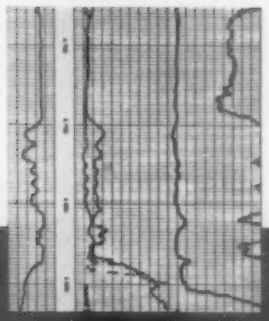

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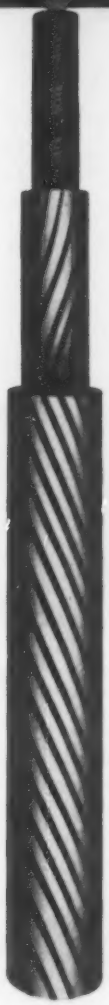

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There's never a doubt about the accuracy of downhole data transmitted over the electronic circuits of Halliburton's exclusive FM Logging System! All interference from the logging cable in a conventional system—the line leakage, resistance to conductors, magnetic properties—is eliminated or minimized in the FM System which uses an electronic tube circuit to power the pickup electrodes and transmit data to the surface.

With this highly accurate vacuum tube circuit replacing the old logging cable, it is now possible to make several simultaneous subsurface measurements with a high degree of accuracy and to send these measurements to the surface unaffected by wide variations in cable characteristics. Only minimum power for operating the circuits, a signal of the order of tenths or less of that normally used, is required which reduces to negligible value the effects of even a deep, hot hole.

Power is transmitted at an impedance level low in comparison with the line leakages usually found with a poor cable. Since modern drilling requires longer, stronger and more expensive cable, it is possible to keep costs low and still maintain accuracy by using a cable that does not require the frequent repairs or replacement of conventional systems.

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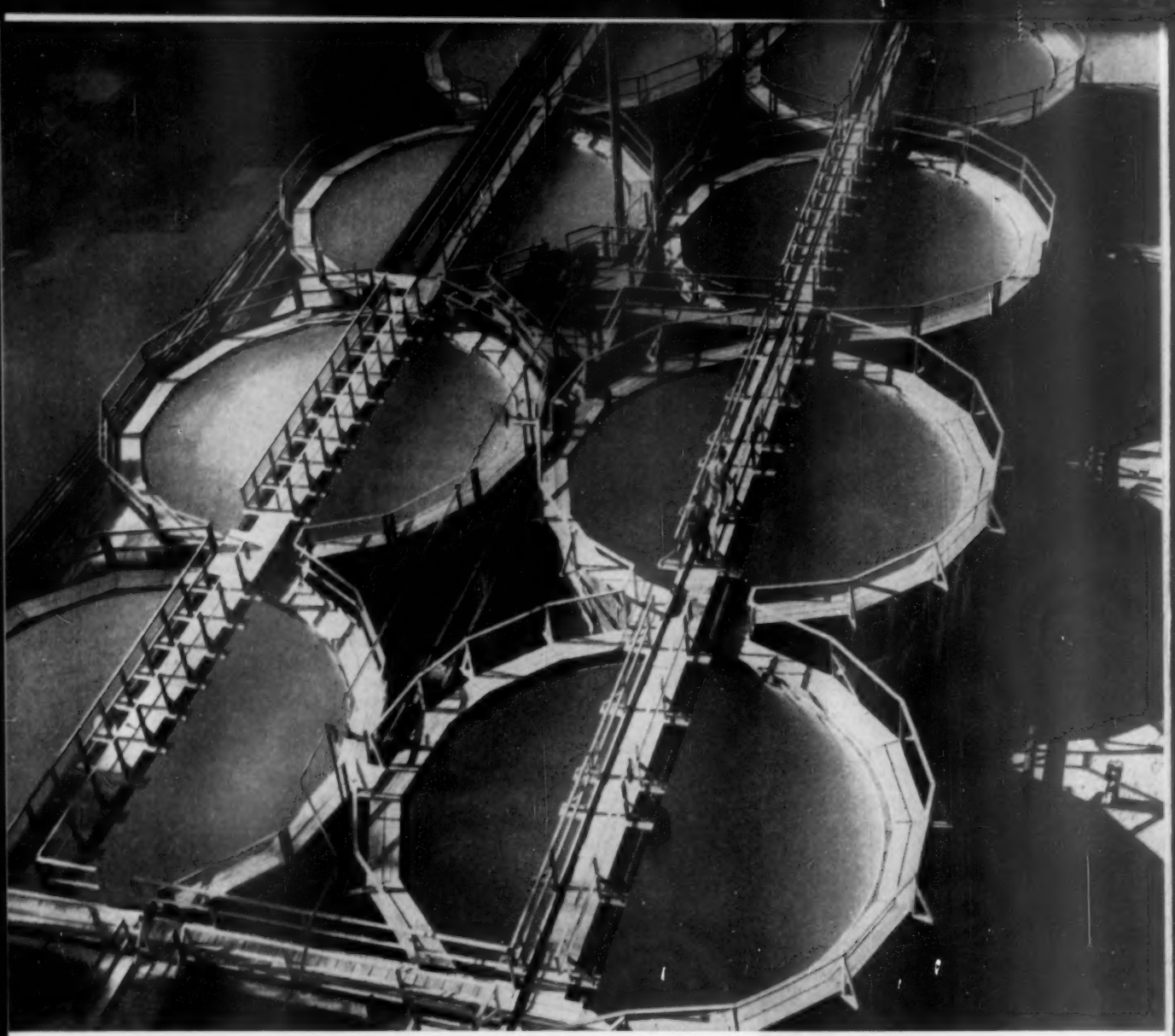

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Republic Aviation operates P&H high-frequency welders as standard metallic arc welders, also, so that duplicate equipment does not have to be purchased.

More than doubles welding speed with P&H

30 P&H TH-200 high-frequency machines make inert gas arc welding 2½ to 3 times faster than former gas welding at Republic Aviation Corporation

No replacement maintenance in three and a half years of two-shift operation

You don't have to take our word for the outstanding performance record of P&H Welders. The following statements are actual quotes from a certified report issued by the H. P. Gould Co. of Chicago, who made an impartial study of welding operations at Republic Aviation Corporation, Farmingdale, L. I., N. Y.

"In the building of faster and better aircraft, new developments in welding have played an important part and P&H high-frequency inert gas welding has proved that it can solve the problems of welding aluminum alloys.

"Three and a half years ago, Republic Aviation tested P&H TH-200 HF Inert Gas AC Arc Welders, and evaluated them against the existing equipment in the plant, as well as against outside competition.

"P&H welders of four different types are now used in four locations in the plant, for the welding of hundreds of different parts. In general, they are welding aluminum alloys from .032" thickness up to .250", and heat-resisting alloys from .010" up to a thickness of .093". For arc-welding alloy steels (4130, 4140, 8630, 8740, etc.), experience has proved P&H electrode AW-4 most satisfactory, and it is used exclusively.

"Republic Aviation welding engineers back up the claim of the makers that P&H welders require very little maintenance. The 30 high-frequency arc welders have had no replacement maintenance whatever in three and a half years of two-shift operation — and the operating cost of each P&H TH-200 HF Welder is only 40¢ per day."

Like Republic Aviation, whose studies show P&H inert gas arc welding to be 2½ to 3 times as fast as former gas welding you, too, can enjoy the money-saving advantages of P&H Arc Welders with Dial-lectric Control. You, too, can get faster, better welds at lower cost.

We've given you the Republic Aviation story in a nutshell! You can get all the detailed facts and figures by reading Gould Report No. 5311. Write for your copy today.

P&H WELDING DIVISION

HARNISCHFEGER CORPORATION

4527 WEST NATIONAL AVE. • MILWAUKEE 46, WIS.

the P&H *Line*

P&H welding equipment is manufactured and sold in Canada by
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This one saves money for ROTARY DRILLERS. The high-carbon cold-drawn steel spring center enables the line to resist crushing, minimizes inside wear, and keeps the line flexible and uniform. The hollow center is lubricant-packed to combat rust and friction.

Ask For Bulletin

PLASTIKORE

This one saves money for CABLE TOOL DRILLERS. The polyvinyl center is not affected by such things as acids, caustics, moisture, or lack of moisture. It gives firm, uniform support to the steel strands, and it remains flexible. PlastiKore provides the "snap-action" you want in cable tool drilling.

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P·E·S·A
PARTNERS IN PETROLEUM PROGRESS

These convoluted couplings of Monel require high surface perfection

ONE OF THE LATEST ACHIEVEMENTS at Solar is the volume manufacture of convoluted couplings made of Monel* metal. They are being used at an Atomic Energy Commission installation to allow for expansion and contraction of the piping in a continuous gas processing system.

These flexible joints are produced in various sizes from 3 inches to 36 inches in diameter, with material gauges from .012 to .038 inch. Specifications require a surface finish absolutely free of contamination or defects. Maximum thinning after polishing out any visible scratch is held to less than .005 inch on the heaviest gauges, and proportionately less on lighter material.

The unusual requirements of these components necessitated setting new quality control standards at every stage, from mill specifications throughout fabrication and processing.

The many special machine tools developed by Solar for automatic welding and forming prove especially helpful on this project. By reducing handling, these machines minimize exposure to contaminating factors and injury.

Production of these high quality couplings is proof of Solar's ability to meet the exacting requirements of modern technology in industries other than aircraft. When you need a precision component designed and built to difficult specifications, Solar is your logical supplier.

*Reg. trade-mark, International Nickel Co.

SOLAR AIRCRAFT COMPANY — SAN DIEGO, DES MOINES

DESIGNERS, DEVELOPERS AND MANUFACTURERS OF METAL ALLOY PRODUCTS

This is What Solar Offers You

Solar specializes in the manufacture of precision products from alloys and special metals for severe service. Solar's experience since 1927 is unduplicated in this field. Solar skills and facilities range from research, design and development through to mass production. Wherever heat, corrosion or difficult specifications are problems, Solar can help you solve them.

PLANTS. *In San Diego and Des Moines (photograph above). A total of 1,400,000 sq ft of floor space. Approximately 5,000 employees. Annual sales over $65,000,000.*

EQUIPMENT. *Production equipment for all types of metal fabrication—forming, machining, welding, brazing, casting, coating. Extensive laboratory and testing equipment. Facilities for development, prototype, limited or mass production.*

SERVICES. *Research, design, development, tooling and production engineering staffs. Experienced with all alloy steels, stainless alloys, super alloys, and titanium and its alloys. Government source inspection and Solar quality control meet rigid aircraft and commercial standards.*

CONTRACT PRODUCTION

Current orders include aircraft engine and airframe parts, alloy castings, pneumatic ducting, atomic energy components. Customers include some of the most honored names among aircraft and industrial companies in the U.S. and Europe.

SPECIAL PRODUCTS

Bellows. *"Sola-Flex"® bellows and expansion joints in many designs from ½ in. up to the world's largest, 28 ft in diameter.*

Gas Turbines. *Solar "Mars" 50 hp engines for auxiliary generator sets, ground carts, portable fire pumps; Solar "Jupiter" 500 hp engines in variable and constant speed models.*

Ceramic Coatings. *"Solaramic"® is the Solar trade mark for a family of coatings that protects metals from heat, corrosion, galling and abrasion.*

Controls. *Complete control systems utilizing the new Solar "Microjet"® principle for control of gas turbines, jet engines and pneumatic devices.*

FURTHER INFORMATION
Your inquiry regarding any Solar service or facility will receive prompt attention. Address
Solar Aircraft Company
Department A-45
San Diego 12, California.

HOW'S THIS FOR OS&D HOSE PERFORMANCE?

Tanker loading conditions are particularly severe at the Union Oil Company's Port San Luis Wharf, Avila, California. When heavy seas are running, tankers must be held some 75' to 100' away from the dock with the aid of four heavy mooring buoys plus the ship's anchor. In spite of these conditions, Hewitt-Robins Smooth Bore Oil Suction & Discharge Hose performs with maximum efficiency.

Normal life expectancy for loading hose at this installation is 15,000,000 barrels, yet a single line of Hewitt-Robins Smooth Bore OS&D Hose has handled over 37,000,000 barrels to date. Here again, a customer's performance record has shown that for longer hose life and more economy in operation the first and best choice is Hewitt-Robins Hose.

For immediate information regarding Hewitt-Robins OS&D Hose or any *Hewitt-Robins industrial hose contact your local Hewitt Rubber Distributor (See "Rubber Products" Classified Phone Book.)*

HEWITT HR ROBINS

Executive Offices, Stamford, Connecticut

DOMESTIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam
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FOR STANDARD OR JACKKNIFE RIGS

Ask Any Rig Operator who uses Tuffy Rotary Line about the ton-mile service he is getting. Don't be surprised if he tells you it's up to twice as good as with ordinary rope. There is good reason for it. Union Wire engineers have developed a wire rope construction to meet the rugged kind of wear that only rotary drilling gives . . . a rope that is the result of years of research, field studies and laboratory testing!

Three Big Features make the difference! First the high-carbon steel that goes into Tuffy Rotary Lines is specially patented for ultimate service. Second, the number, size of wires and lay of the rope, and third the pre-shaping around an independent wire rope core are scientifically designed for rotary drilling. They add up to a rope that should give you more ton-miles of service than any rotary line you've ever used!

Get All The Ton-Miles You Pay For by switching to Tuffy Jackknife—specially designed for use on jackknife rigs—or Tuffy Standard for standard rigs or deeper drilling with jackknife rigs!

FREE **Ton-Mile Indicator and Log Book.** Provides you with a slide-chart method of figuring ton-miles quickly and easily, and with it you get a log book in which to record your ton-mile record.

FREE **Cut-off Practice Book.** Outlines the quick, easy way to tell when to cut-off and how much. Shows how to obtain maximum service from rotary lines and avoid costly cutting too soon or too late. Carries cut-off tables for derricks of all heights operating in all major oil regions.

FREE **Handbook of Wire Rope for Well Drilling and Servicing.** More than 40 pages of useful facts on wire rope for rotary, cable tool drilling and well servicing. Includes sizes and constructions of wire rope for all oil field services, its care, lubrication, abuses, correct handling, seizing and socketing.

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Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

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At no obligation to me, please rush the material I have checked below:

- ☐ Cut-off Practice For Rotary Drilling Book
- ☐ Ton-mile Indicator and Log Book
- ☐ Handbook of Wire Rope for Well Drilling
- ☐ Put my name on the list for mailings of new Rope Dope Bulletins

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Fight Corrosion

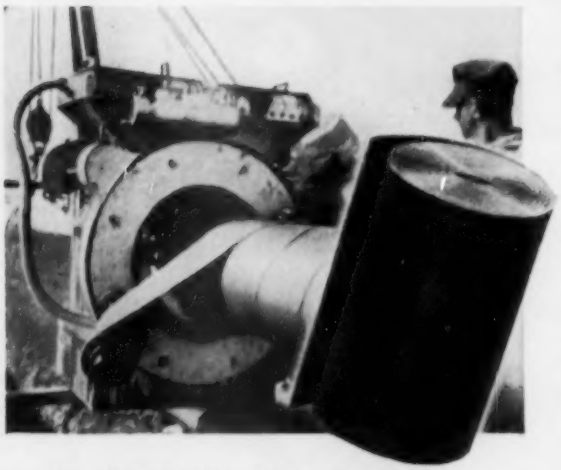
with these

Johns-Manville Pipe Protection Materials

...cut maintenance expense
increase pipe life

TRANSHIELD Asbestos Felt—

This newly developed low cost pipe line protecting wrapper is designed for average soil conditions. It is reinforced with continuous glass yarns, parallel spaced on ¼" centers to give tear-free application strength. Made of coal-tar saturated asbestos, it acts as a continuous barrier to shield pipe line enamels from earth loads and soil stresses.



15-LB. ASBESTOS Pipe Line Felt—

A heavy-duty material particularly suitable for severe soil conditions or where a heavier material than J-M Transhield is desired. Provides long life, toughness, flexibility, resistance to rot, decay, cracking, and impact. J-M 15-lb. Asbestos Felt now protects more than 100,000 miles of oil and gas pipe lines. Widths 2" to 36". Rolls any length desired.

TRANTEX® Polyvinyl Tape—

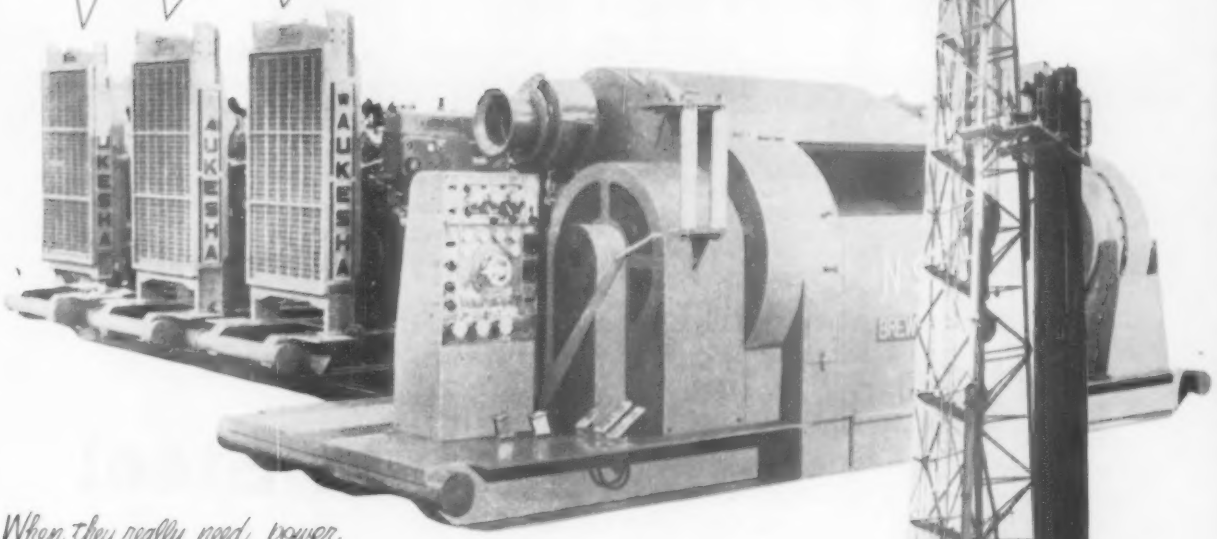
A widely used coating where ease of application is important . . . over field welded joints of mill-wrapped pipe . . . for rush coating needs. Pressure-sensitive . . . sticks to pipe on contact, forming a firm stable bond. Can be cold-applied by hand or with simple wrapping machines. In rocky soils, an outer wrap of J-M Transhield or J-M 15-lb. Asbestos Pipe Line Felt is recommended.

For further information about Johns-Manville Products for Pipe Line Protection, write to Johns-Manville, Box 60, New York 16, N. Y.; in Canada, 199 Bay St., Toronto I, Ont.

JM PRODUCTS

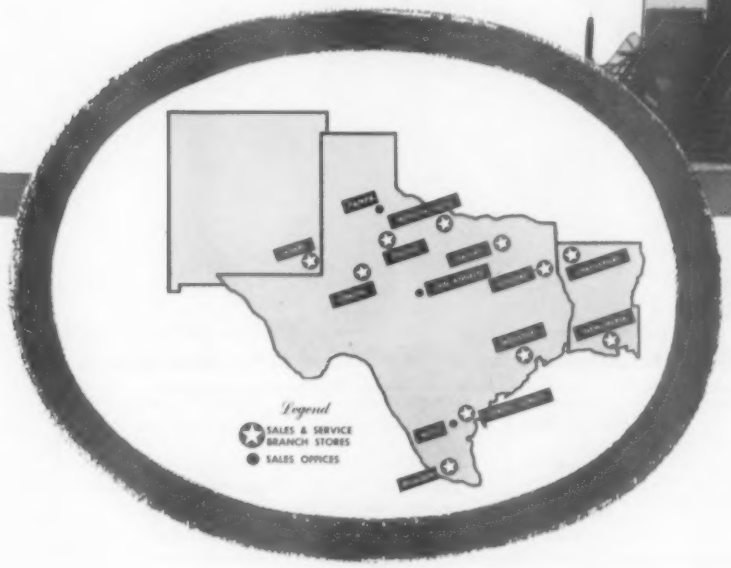
Johns-Manville PRODUCTS FOR PIPELINE PROTECTION

POWER
POWER
POWER



When they really need power they use Waukesha. McFarland's rig #6, with Brewster's new N-95 drawworks is down 13,000 feet and going deeper every day with three L.R.O. Waukeshas. Waukesha engines, sold and serviced by Waukesha Sales & Service, Inc. furnish you the reliable power to start and to finish.

POWER
POWER
POWER



WAUKESHA

Sales & Service, Inc.

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EXCLUSIVE DISTRIBUTORS FOR WAUKESHA PRODUCTS IN TEXAS, NORTH AND WESTERN LOUISIANA, SOUTHERN ARKANSAS AND NEW MEXICO

Water treatment gives you better pipe!

To give you quality line pipe that meets your exact specifications, every length of Basalt-Kaiser steel pipe 20 inches and over is expanded by water under great pressure.

Hydraulic expansion increases the strength of Basalt-Kaiser steel line pipe through additional cold working. This takes place within restraining dies assuring accurate diameter, concentricity, and straightness.

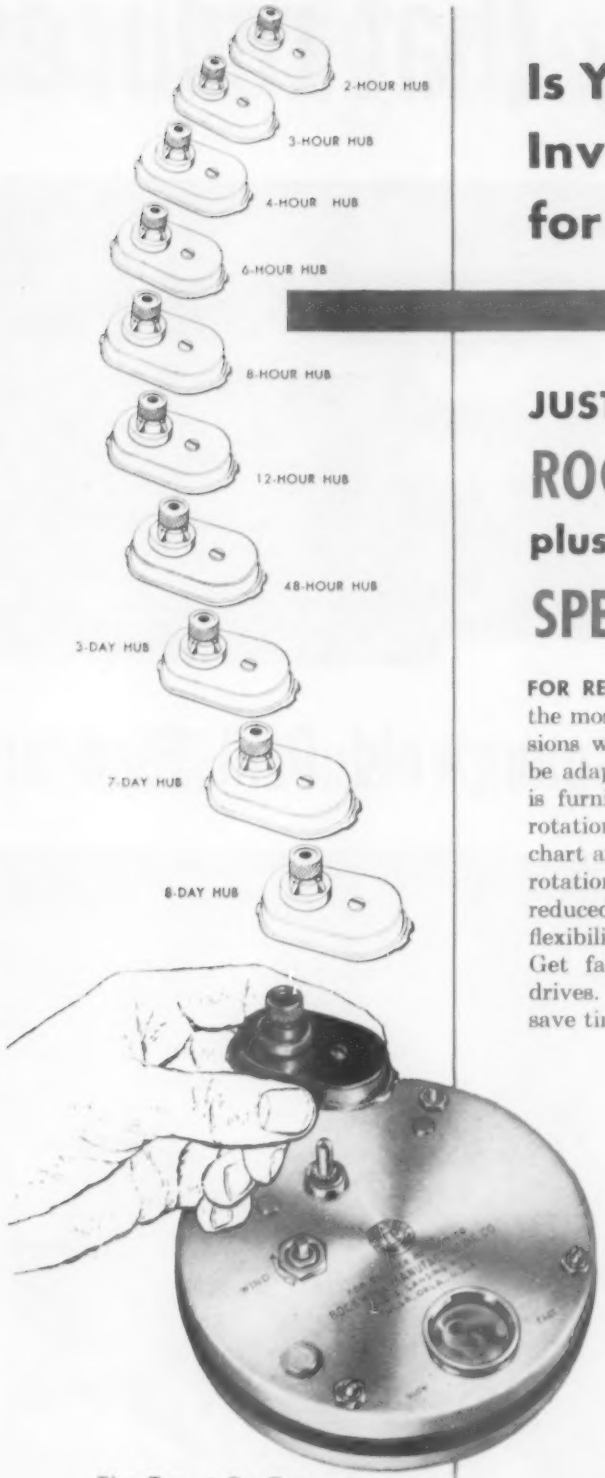
Add to this our *on-time delivery, wide range of sizes* and *prompt personal service* and it's clear why pipeline men know they can rely on Kaiser Steel.

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	14" to 18" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅝" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	20" to 30" O.D.	Up to 40'	.250" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York



The Turret On Top Does The Trick

Illustrating how the speed changing turrets are applied to the chart arbor to provide a wide selection of rotation rates.

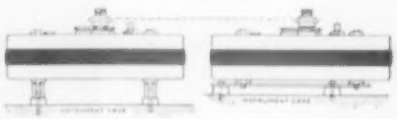
Is Your Chart Drive Inventory Ready for Cold Weather?

JUST STOCK BASIC ROCKWELL CHART DRIVES plus a selection of inexpensive SPEED CHANGING TURRETS

FOR REPLACEMENT SERVICE, the Rockwell chart drive is the most versatile, economical you can use. Design dimensions were deliberately established so that the drive can be adapted to fit practically all instruments. One adaptor is furnished with each drive. There is no problem with rotation rates either. Speed changing turrets lock onto the chart arbor of the Rockwell drive to provide any one of 11 rotation cycles. Think what these features mean to you in reduced chart drive inventory, servicing and all-around flexibility of application.

Get facts now on versatile, long-lived Rockwell chart drives. Learn how their use in your instrument shop will save time and money. Write for bulletin 1079.

ADAPTORS TO FIT PRACTICALLY ANY INSTRUMENT



Illustrations show how adaptors are used to correctly locate Rockwell chart drives within instrument cases both as to position and height.

YOU CAN RELY ON ROCKWELL

ROCKWELL MANUFACTURING COMPANY

INSTRUMENT DIVISION • BOX 2396, TULSA, OKLA.

Atlanta • Boston • Charlotte • Chicago • Dallas • Houston
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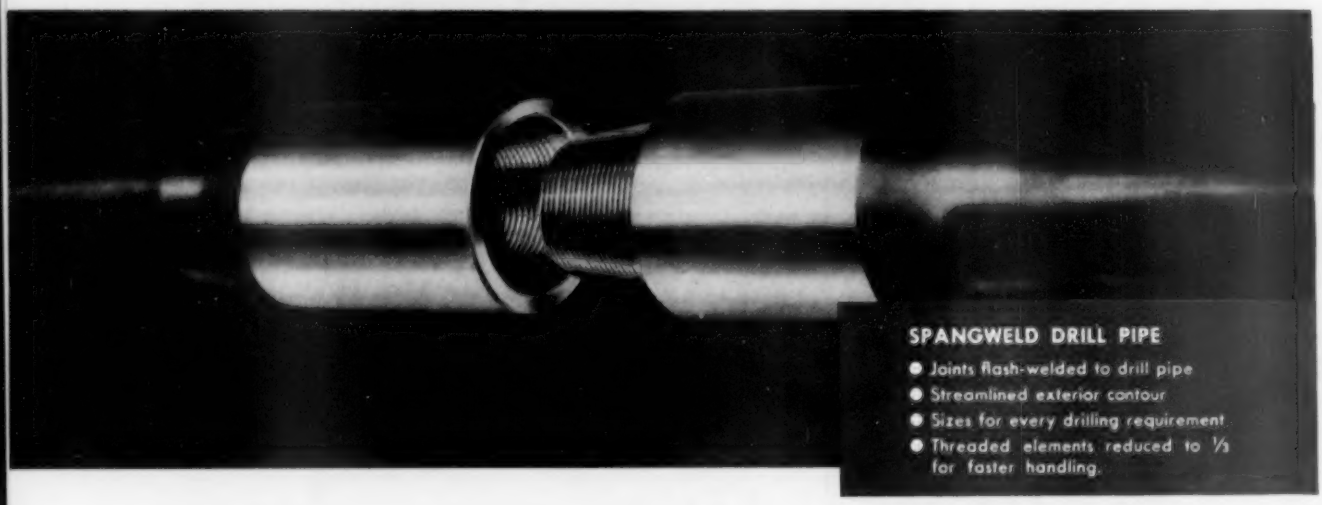
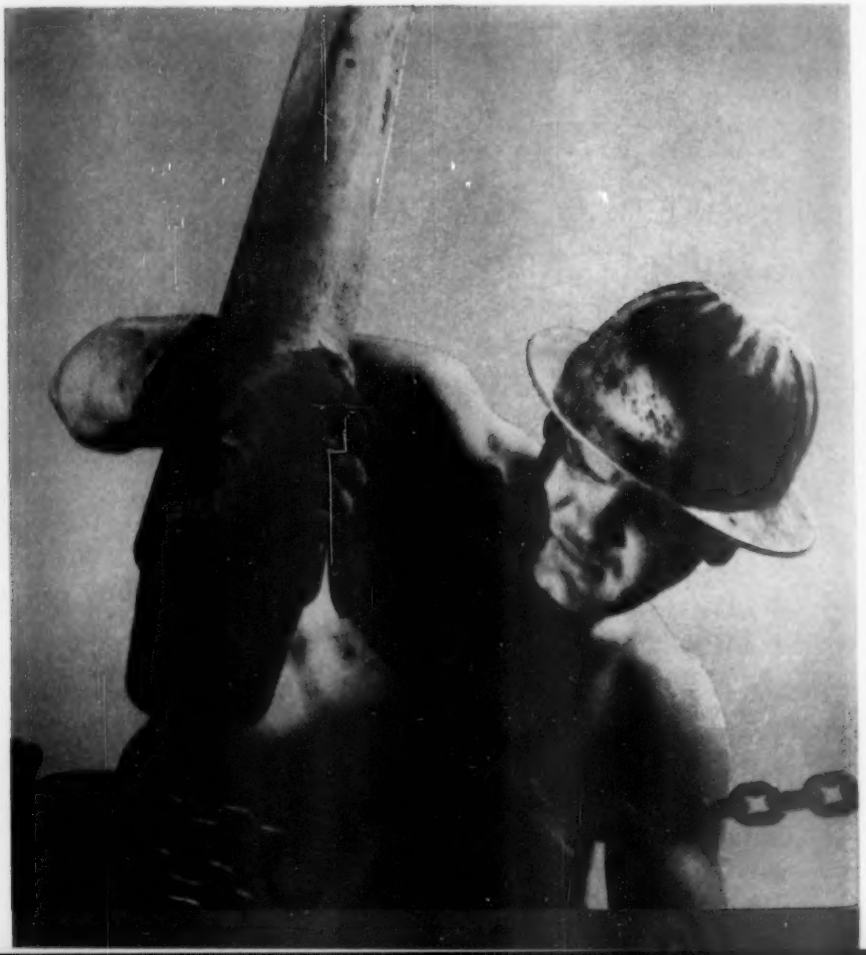


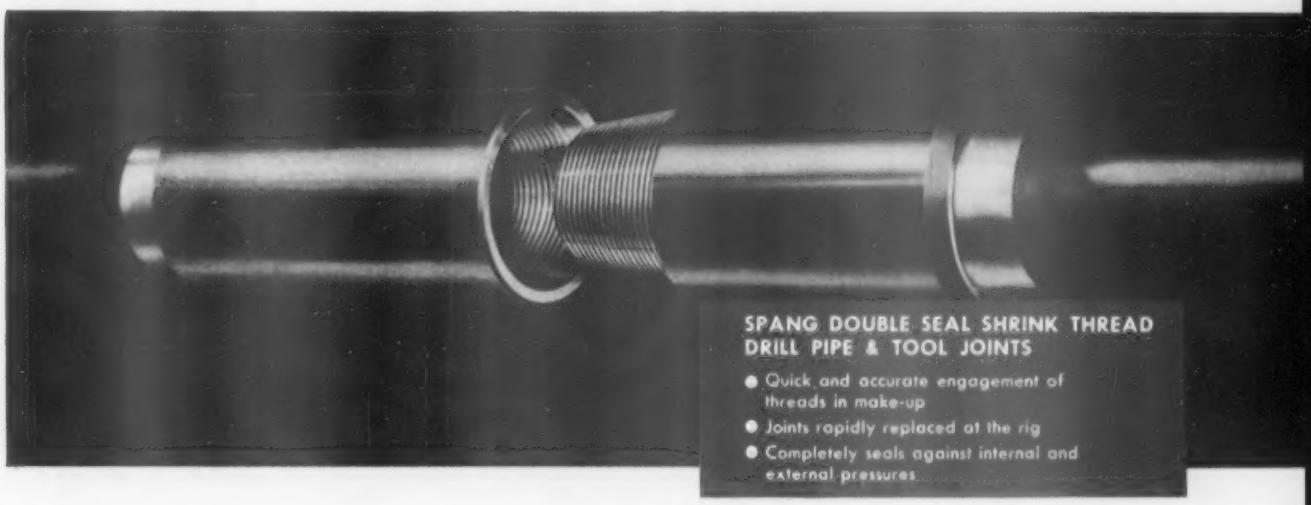
SPANGWELD DRILL PIPE

- Joints flash-welded to drill pipe
- Streamlined exterior contour
- Sizes for every drilling requirement
- Threaded elements reduced to ⅓ for faster handling.

. . . specify Spangweld Drill Pipe and



operating costs,


SPANG DOUBLE SEAL SHRINK THREAD
DRILL PIPE & TOOL JOINTS
● Quick and accurate engagement of threads in make-up
● Joints rapidly replaced at the rig
● Completely seals against internal and external pressures

SPANG® Double Seal Shrink Thread Drill Pipe

From the kelly to the rock bit, these dependable Spang Tubular Products pay off in the well. Developed to withstand the stresses and pressures of modern drilling conditions, both Spangweld and Spang Double Seal Shrink Thread Drill Pipe are highly resistant to leakage, fatigue, tension and corrosion failures.

The reasons for this stamina are outstandingly evident in the tool joints of each. Streamlined Spangweld Drill Pipe has only ⅓ of the number of threaded elements found in conventional drilling strings.

Precision metal-to-metal seals in the Spang Double Seal Shrink Thread tool joint eliminate leakage and washout, prevent fluid entry into threads and provide high resistance to creepage. Whenever necessary, Spang Double Seal Shrink Thread tool joints can be rapidly replaced at the rig.

For highly abrasive service, both Spangweld and Spang Double Seal Shrink Thread tool joints are available with hard-facing.

CORROSION RESISTANT PLASTIC COATING AVAILABLE FOR SPANG DRILL PIPE

To increase corrosion resistance, a phenolic plastic coating can be applied at the mill on all Spang Drill Pipe and Tubing. Ask the National Supply Representative about this Spang service.

First in quality . . . First in supply service . . . in oil country everywhere

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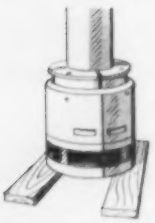
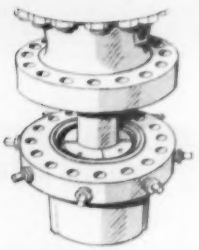
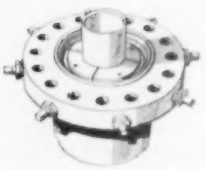
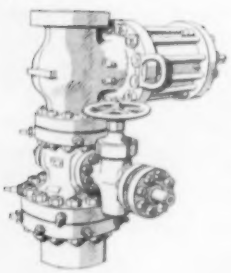
This is no place to take chances





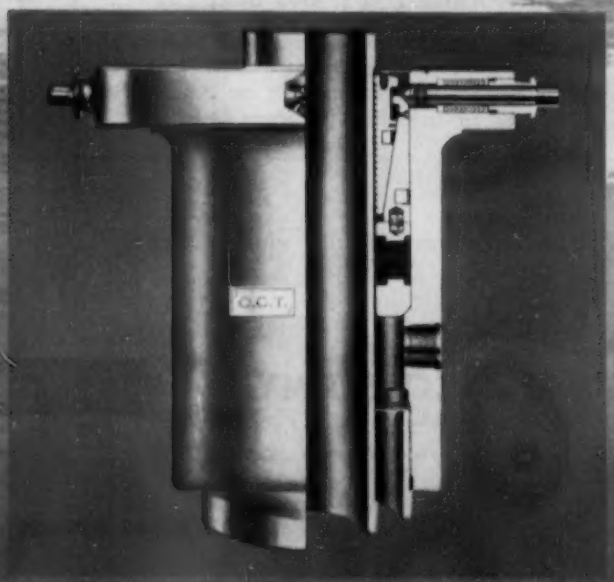




O-C-T C-19 CASING HEADS

give you greater safety and dependability than any other hanger you can buy--

Miles out in the Gulf is no place to risk a blowout around casing. O-C-T "C-19" Casing Heads eliminate this risk by providing a positive casing seal and suspension before blowout preventers are removed. When dropped through preventers, suspension and seal are automatically effected. In addition, slip hanger load capacity is in excess of 600,000 lbs. It automatically suspends and seals. Hazardous installation work is cut to a minimum. Hours of valuable rig time are saved. You can depend on O-C-T "C-19" Casing Heads for greater safety and economy. The "C-19" is the only automatic self-sealing suspension unit that has been proved by performance on the world's longest strings of casing. You take no chances with O-C-T. Ask your O-C-T representative for details.



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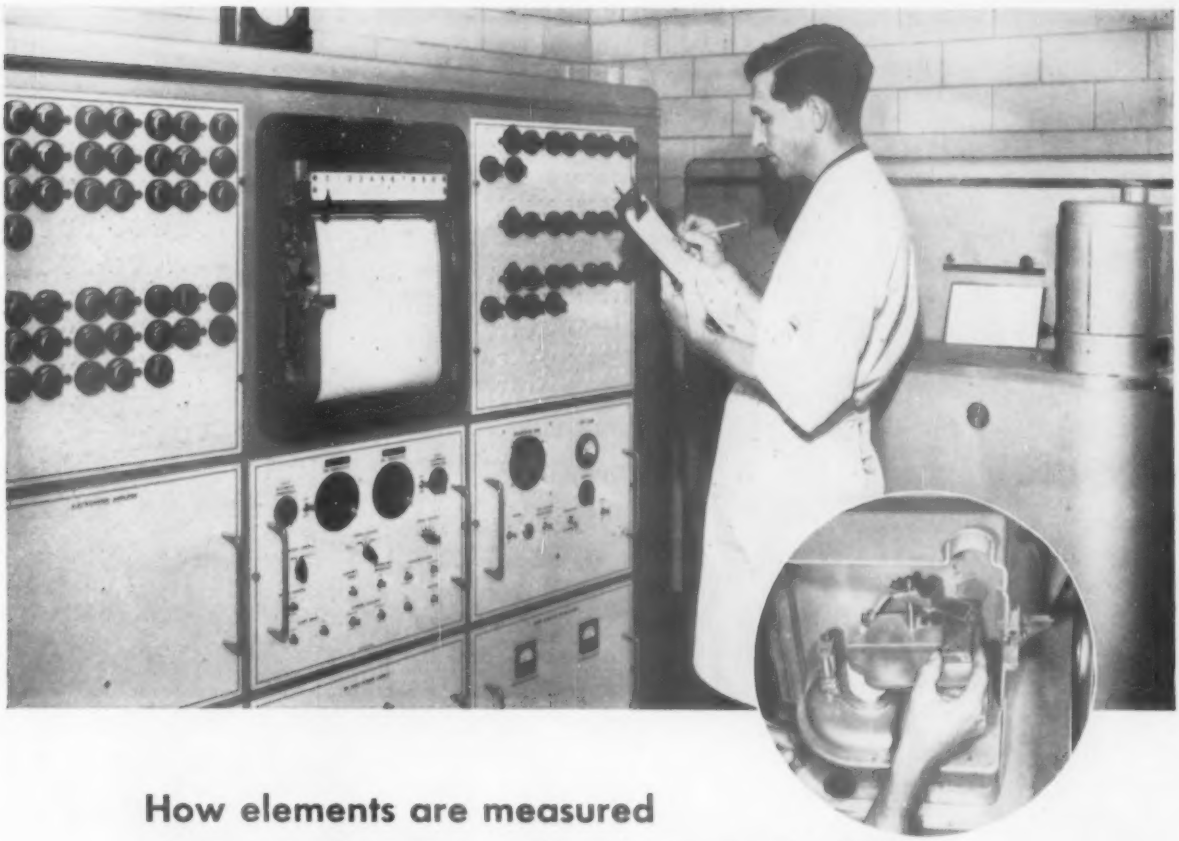
OIL CENTER TOOL CO.

Export Representatives: Sterling Areas — Le Grand, Sutcliff & Gelle Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston, Texas.



How elements are measured electronically to the millionth part in Sheffield

ALLOY STEEL

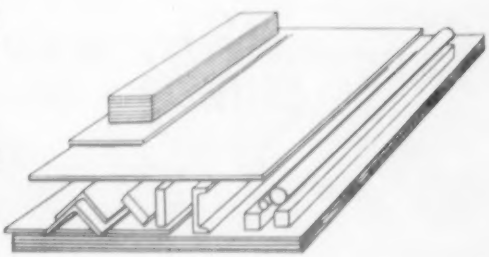
The high-strength, light-weight alloy steels you use must be made precisely to formula. Through the entire Sheffield steelmaking process, samples are constantly checked to determine and control percentages of nickel, manganese, chromium, molybdenum, copper and other alloy elements.

In about 60 seconds the Electronic Analyzer pictured above reports the percentages of these elements in a sample of steel from the furnace. It does this by spectro-chemical analysis. Each chemical element, when burned in an arc or spark, sends out a set of radiations. Their position in the color spectrum is characteristic of that element and no other.

Identification of the distinguishing spectrum lines permits precise quantitative analysis of the metallic elements present in steel in concentrations as low as one part in a million. This spectro-chemical equipment, by means of phototubes, measures and records the intensity of the light emitted by each alloy element.

This is just one of the quality control operations that attend the making of Sheffield Alloy Steels from raw materials to finished steel. And one of many reasons why it is to your advantage to specify Sheffield Alloy Steels in your operation.

SHEFFIELD
ARMCO
ALLOY STEEL



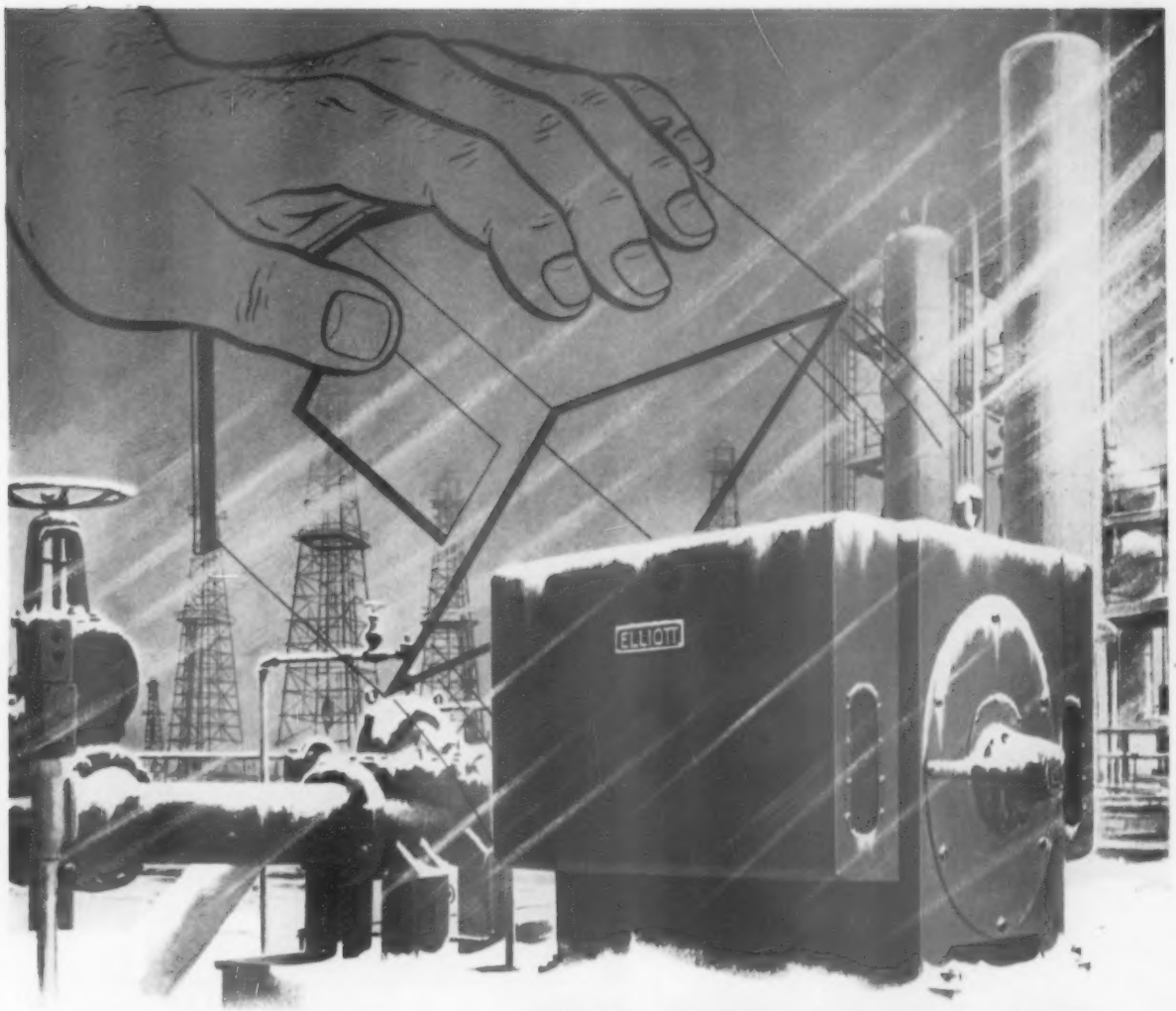
SHEFFIELD STEEL
DIVISION
ARMCO STEEL CORPORATION
SHEFFIELD PLANTS: HOUSTON KANSAS CITY TULSA

. . . he reads good news a billion years old

In fossils of tiny plants and animals that lived up to a billion years ago, the petroleum scientist finds clues to tomorrow's oil. For the fossils he finds in an underground rock formation assist in determining whether conditions are favorable for the accumulation of oil. Such studies are only part of a complex and costly search that goes on constantly in the effort to increase the reserves of a nation that gets more than half its energy from petroleum.

SHELL

SHELL OIL COMPANY



How to duck a HOUSING PROBLEM

Elliott outdoor-splashproof (weather-protected) motors have projected a new economy into the industrial picture.

A big motor must breathe. It needs a constant stream of cooling air, clean and dry, through its coils and windings. For outdoor service you can, of course, use a standard open motor and build housing over it. Or you can install a totally-enclosed motor. Both means are unnecessarily expensive. The happy, economical alternative is this Elliott outdoor motor, which breathes outdoor air, but rejects moisture, sleet, snow, dust, dead leaves, even insects and small animal life. An ingenious arrangement of sheet steel baffling, screens and filters does the trick.

Elliott outdoor motors are a typical product of the sound engineering and development work which in half a century has made the Elliott Company one of America's important builders of a broad line of equipment for power and process use. For complete details on any of this equipment, contact your local Elliott field engineer, or write the Elliott Company, Jeannette, Pa.

ELLIOTT Company

Q4-6

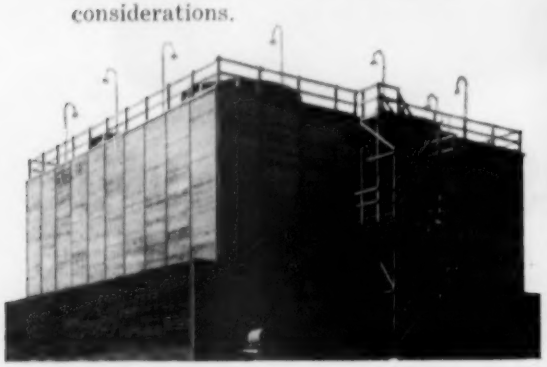
TURBINE-GENERATORS TURBINES MOTORS GENERATORS DEAERATING HEATERS EJECTORS CONDENSERS COMPRESSORS TURBOCHARGERS TUBE CLEANERS STRAINERS

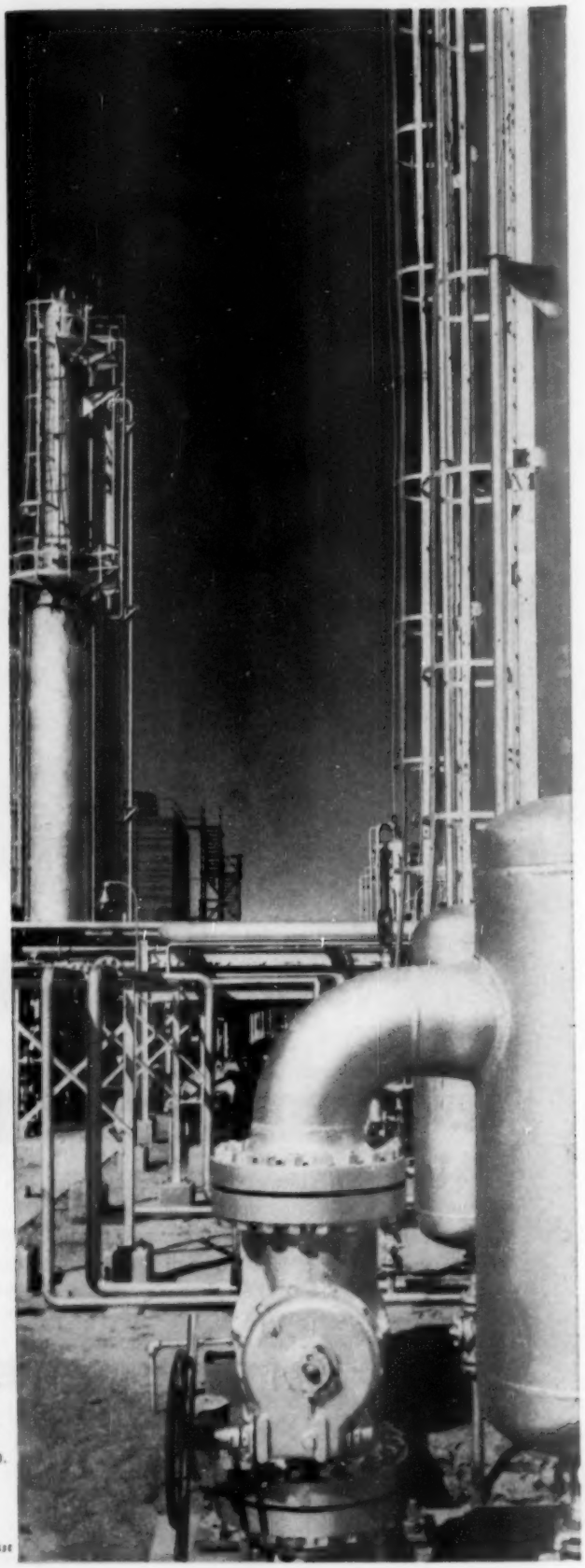
TALL TOWERS NEED COOL WATER

The best way to cool water for your vital refinery processes is with Pritchard heavy-duty cooling towers.

Why Pritchard towers? First, because you want your initial investment to be economical. Second, because you want each tower to do the job it was designed to do with maximum operating efficiency and water savings . . . minimum operating expense and maintenance costs.

You can depend on Pritchard to satisfy these two important considerations.





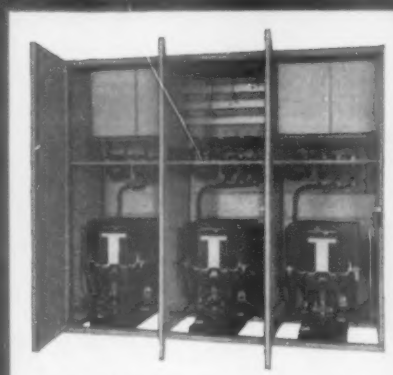
Industry's Partner for Progress

J. F. Pritchard Co.
OF CALIFORNIA
A DIVISION OF J. F. PRITCHARD & CO.
Dept. 378, 210 West 10th Street, Kansas City 5, Mo.

COOLING TOWERS
SPECIALIZED HEAT EXCHANGERS
GAS & AIR TREATING EQUIPMENT

Representatives in Principal Cities from Coast to Coast

"Starting Line-up"



Rear view of HALC Controller Line-up. Bus covers provide maximum protection for personnel and equipment. Starters may be equipped with either oil-immersed or air-break contactors . . . installed in the same space. All components are readily accessible for maintenance.

ALLIS-CHALMERS

Type H Starters

FOR 2300 TO 5000 VOLT MOTORS

FACTORY ASSEMBLED CONTROL GROUPS ARE

▸ Easy to Install ▸ Simple to Expand ▸ Attractive in Appearance

The factory assembled line-up of Type H Starters affords the many advantages of centralized high voltage control for an entire department or plant. One attractive, space-saving group takes the place of many separate cabinets and components. Planning and purchasing are simplified. Installation is quick and easy — only one incoming power feeder required. Internal bus and convenient wiring provisions plus standardization of cubicle size facilitate the addition of starters.

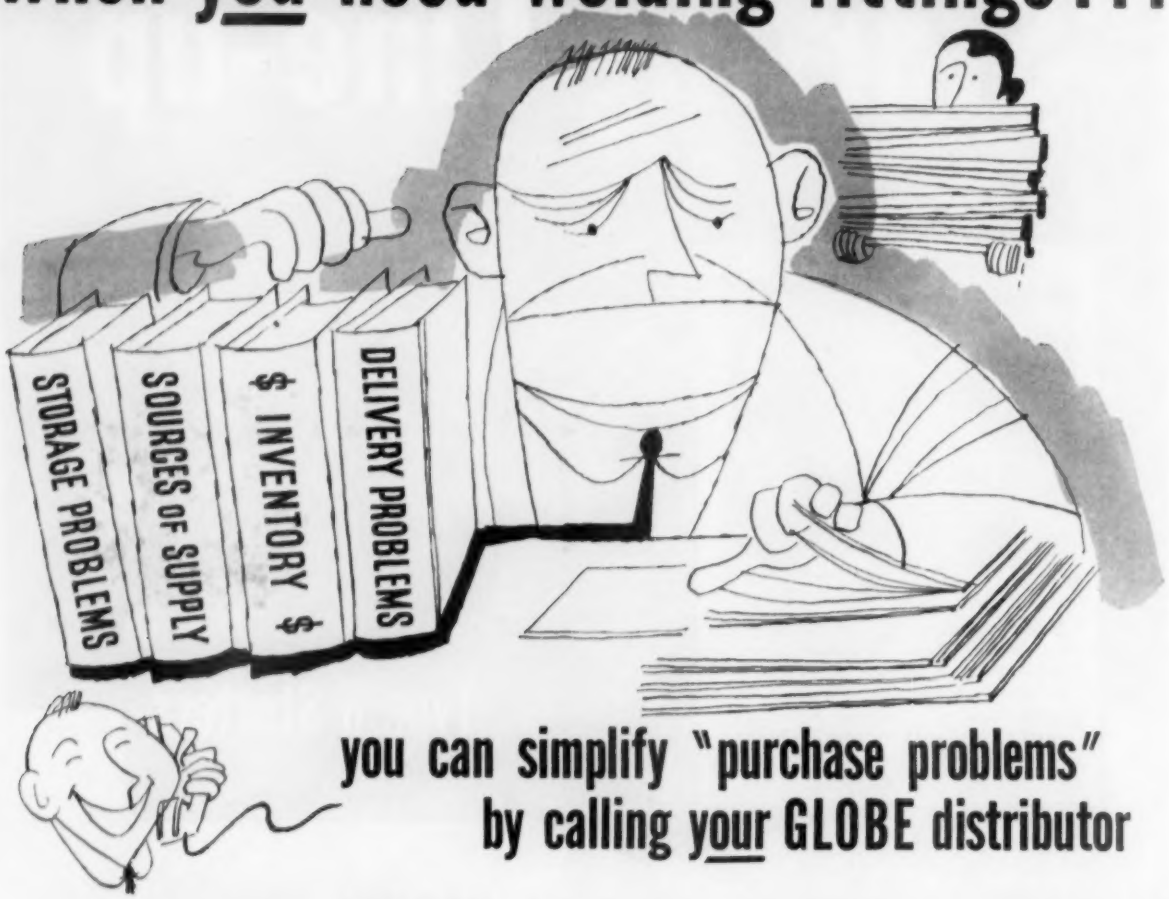
Allis-Chalmers Type H Starters may also be used singly. Each starter is a complete control unit. Contactors, protective devices, meters, relays . . . all the coordinated components necessary for maximum protection of man, motor and machine are engineered into each starter. A-4217

New Bulletin — Type H Starters are built in a wide range of ratings for squirrel-cage, wound-rotor and synchronous motors . . . for full or reduced voltage . . . reversing or non-reversing . . . with plugging, dynamic braking and multi-speed features. New bulletin 14B6410B tells the complete story. See your nearby A-C representative or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

When you need welding fittings...



you can simplify "purchase problems" by calling your GLOBE distributor

Avoid storage problems — dollars tied up in inventory. Hold your "stock on hand" to a sensible, easy-to-work-with quantity.

Your Globe distributor carries a wide range of sizes and types of Globe Precision-Process welding fittings in stock . . . can supply you with the seamless welding fittings you need . . . *as you need them.*

Get the facts now. Contact the Globe distributor nearest you and ask him to show you how and why he'll be able to save you time, money, and trouble when you need welding fittings.

GLOBE STEEL TUBES Co., Milwaukee 46, Wis.

For the name of your Globe distributor, call any of these District Offices.

Chicago • Cleveland • Denver • Detroit • Glendale, Calif. • Houston
New York • Philadelphia • St. Louis • San Francisco

Only Globe — among manufacturers of seamless Welding Fittings— produces its own seamless tubes. Only Globe offers you precision-processed fittings through every step of production — from billet to tube to fitting.

GLOBE
PRECISION PROCESS

SEAMLESS WELDING FITTINGS

GLOBE TUBES

Producers of Globe seamless stainless steel tubes— Gloweld welded stainless steel tubes — alloy — carbon — seamless steel tubes — Globeiron (high-purity ingot iron) seamless tubes — Globe Welding Fittings.

new... FREE POCKET-SIZE MANUAL ON UNLOADING AND HANDLING CAUSTIC SODA

EVERY MAN IN YOUR PLANT WHO UNLOADS, HANDLES OR STORES CAUSTIC SODA SHOULD HAVE A COPY. It provides the practical information on accepted safe practices in working with this chemical.

Contains 28 illustrated pages in convenient pocket-size.

FILL OUT AND MAIL TODAY!

Columbia-Southern Chemical Corporation
One Gateway Center, Pittsburgh 22, Pa.

Gentlemen: Send me at no cost _____ copies of your new booklet on the Unloading and Handling of Caustic Soda.

Name _____

Title _____

Company _____

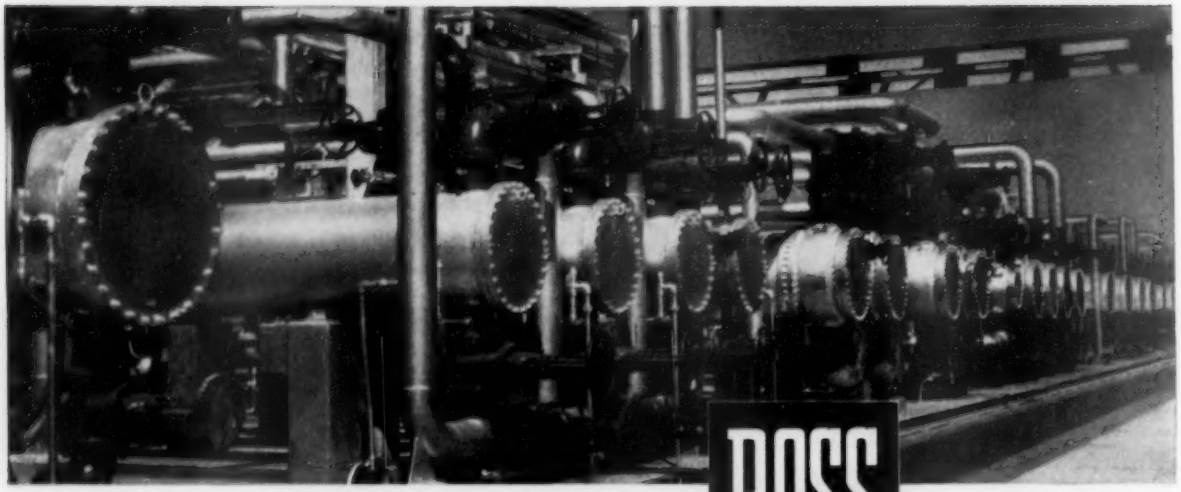
Street _____

City _____ State _____

Yes ☐ Also, please send me a copy of your new booklet, "The Economics of Caustic Soda."

COLUMBIA-SOUTHERN CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER · PITTSBURGH 22 · PENNSYLVANIA

HEAT EXCHANGERS BY THE MILE



If you watch production at the Kewanee-Ross plants, you'll see the world's most modern heat exchanger assembly techniques at work . . . moving exchangers and condensers down the lines by the thousands . . . to serve industries here and abroad.

Complex, highly specialized refinery exchangers and giant power plant surface condensers . . . one of a kind or dozens alike. Completely standardized engine oil and water coolers, compressor inter and after coolers, hydraulic fluid coolers . . . hundreds upon hundreds of identical units. End-to-end, they would stretch out for miles.

Standardized or specialized, mammoth or pocket size, single or by the thousand . . . whatever industries require in heat exchangers, Kewanee-Ross makes it. In its long, diversified experience, this Company has engineered and built virtually everything that is sound and practical in heat transfer equipment.

Where can you find a more qualified source for serving *your* requirements? Who could possibly be in a better position to work with you . . . to recommend and *deliver* exactly what you need? Your request will bring a Kewanee-Ross engineer promptly to your desk. Write.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE • BUFFALO 13, N. Y.
In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

MEMBER TEMA

Serving home and industry: AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

Atlas Rig
Rated Capacity
10,000 feet with 4½"
drill pipe

DON'T BUY AN OBSOLETE RIG

BE MODERN-BUY WILSON!

First choice with Drilling Contractors . . . Best Friend of the Auditors. Wilson — the FIRST NAME in DRILLING RIGS! The only compound rigs with EIGHT SPEED, ALL-FRICTION DRIVES. Wilson . . . the Power Rig Pioneer . . . is still years ahead of the field.

Wilson

The FIRST NAME in DRILLING RIGS!

WILSON MANUFACTURING CO., Inc.

The HOME of RED Iron • WICHITA FALLS, TEXAS, U.S.A.

CARBIDE

the NAME to keep in mind

...for MONOETHANOLAMINE DIETHANOLAMINE DIETHYLENE GLYCOL TRIETHYLENE GLYCOL

You get *more* than gas-treating chemicals when you specify CARBIDE . . .

You get these extra benefits...

- the results of CARBIDE's 20 years' experience in the manufacture of amines and glycols.
- the service of CARBIDE's field representatives.
- the assistance of CARBIDE's laboratories where specialists devote a great amount of time to work on customer service problems.
- the benefit of CARBIDE's knowledge about the handling, properties, and use of these chemicals.
- the assurance of availability and fast service through CARBIDE's national distribution network of 50 warehouses. (In Canada: Harrisons & Crosfield's.) Shipments are made in tank cars, tank wagons, and drums in carload or truckload lots.

Remember

You get *more* than chemicals when you specify CARBIDE.

CARBIDE AND CARBON CHEMICALS

Carbide and Carbon Chemicals Company
A Division of
Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.

Photographs taken on the job in Long Island, N. Y.

Here's what they say about the new MICHIGAN® 3/4 YARD

Contractor: Hendrickson Bros., Inc., General Contractors
Valley Stream, New York

Job: Excavation and pipe laying for Southern State Parkway, Long Island

MASTER MECHANIC:
"We tried out the new T-24 for a week; and, because it did such a good job in that short time, we bought it."

OPERATOR:
"It's got delicate control and positive action. I can put the bucket down just where I want it, pick up a cable or wooden stake and not even disturb the dirt. It's a fast machine."

OILER:
"This Michigan is an oiler's dream. The liberal use of ball bearings on shafts, drums and rollers means less wear and much less oiling. All we do is oil our T-24 once a week."

There's little to add to these Hendrickson statements—except to emphasize that you, too, will move bigger yardage faster and at less cost with a MICHIGAN Series "24" ¾-yard excavator-crane. Best way to prove it is to do as Hendrickson did . . . TRY IT! Send for the booklet "Bigger Yardage Through Air Power"; and for detailed specifications.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Div.
448 Second Street
Benton Harbor, Michigan 24

Please send the booklet "Bigger Yardage Through Air Power" and specifications of MICHIGAN Series "24".

Name_____
Firm_____
Address_____
City_____

1 With an ordinary hand saw, cut the pipe to whatever length you need, right on the spot.

2 Clean the outside of the pipe and the inside of the plastic fitting. Fittings are available from Republic.

3 Using a standard paint brush, coat the inside of the fittings and the outside of the pipe with thinner.

4 Use same brush to apply welding solution to male end of pipe. Apply solution to within ¼" but not closer than ⅛" from end of pipe. This prevents internal bead from forming.

5 Stab pipe in fitting, give one-eighth turn, and the job is finished. This method of joining speeds new lines as well as replacements.

HOW TO INSTALL OIL PIPE LINES

...THE NEW EASY WAY

Your next oil field pipe line installation will be unusually easy if you use Republic Semi-Rigid Plastic Pipe. One reason: it's lightweight—3" pipe weighs only 13 lbs. per 20-foot length. Truck loading and unloading are simplified. Field assembly is speeded up. One man can easily carry several lengths at once. Even ditch a whole string by himself.

Joints are easy to weld, too, right on the spot. Tools? Ordinary hand saw and paint brush. Just follow the five simple steps illustrated at the left. When connection to steel pipe is necessary, a special flange adapter is provided.

Another big advantage: Republic Semi-Rigid Plastic Pipe, made of butyrate, is highly resistant to corrosive elements in petroleum products. Its smooth walls resist paraffin-clogging. This means long life, minimum maintenance.

Semi-Rigid comes in 20- and 40-foot straight lengths, in 9 sizes from ½" through 6". In coils, ½", ¾" and 1" diameters are available. It is normally supplied in black. Clear pipe is available on request. Remember: Republic Semi-Rigid Plastic Pipe is made by pipe men—men who know your piping problems. For complete information, send for Booklet No. 603.

NEW FREE BOOKLET No. 603 gives sizes, lengths, test pressures and other valuable information on Republic's New Semi-Rigid and Flexible Plastic Pipe. Write for it.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

REPUBLIC PLASTIC PIPE
SEMI-RIGID AND FLEXIBLE

Other Republic Products include Casing — Tubing — Line Pipe — Bolts, Studs, Nuts and Rivets — Heat Exchanger Tubes — Steel Buildings

They Say—

Iranian Follow-Up

"An agreement satisfactory to both sides, freely negotiated and reviewed, and undertaken with a spirit of good will and respect on both sides was essential. However, even more important is that the agreement will be carried out in the same manner.

"This vital task will fall upon those who will manage and worked for the operating companies in Iran. They must, however, have the whole-hearted support of shareholders, who, in turn, must see that all involved are properly selected and indoctrinated. Differences of opinion are bound to occur. Willingness to understand the other point of view and patience in explanation are essential virtues to the successful operation of such ventures."

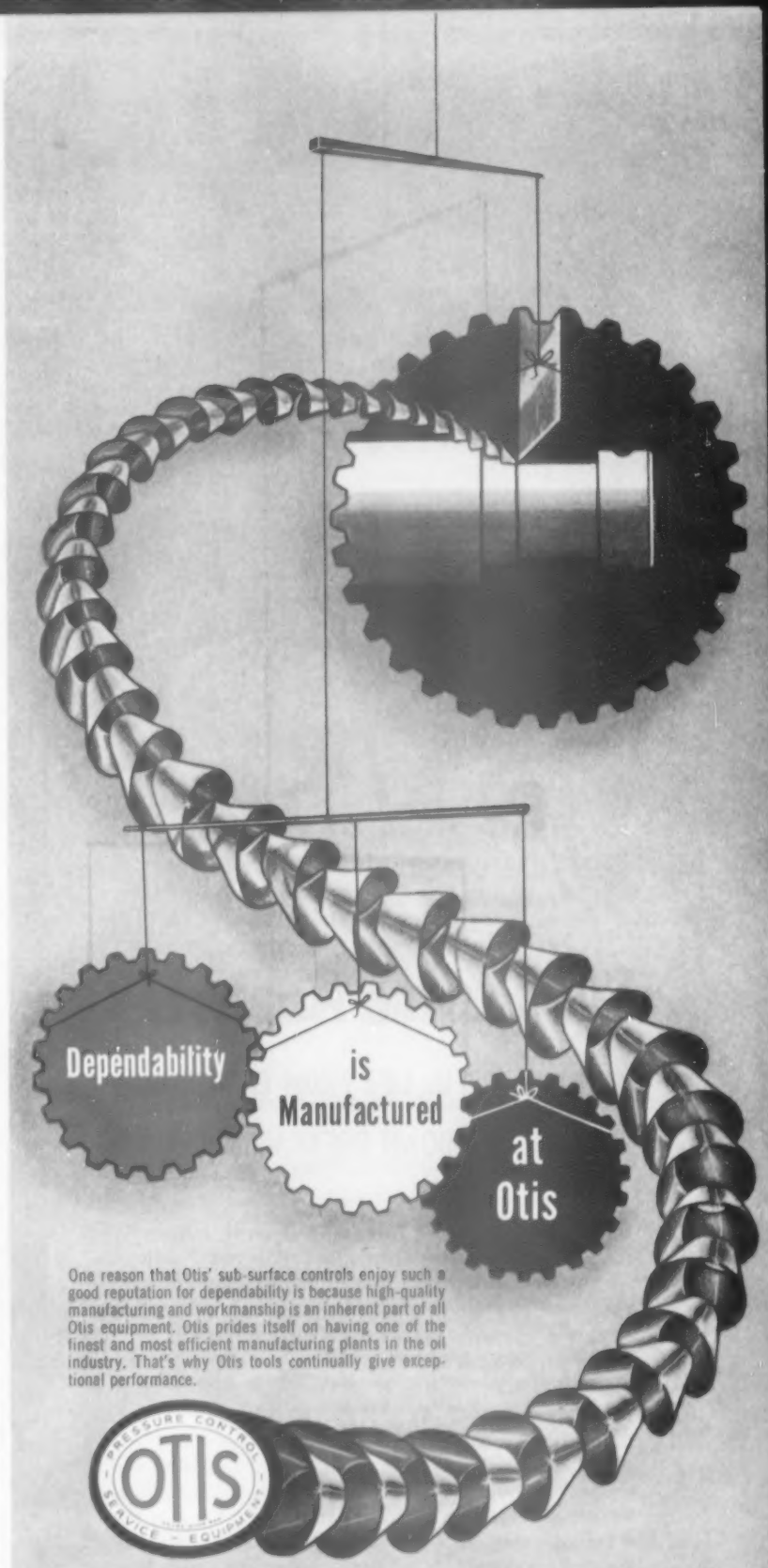
Howard W. Page, director, Standard Oil Co. (N.J.) and negotiator of the Iranian agreement, in an address at the American Petroleum Institute's annual meeting in Chicago.

"Socialistic Regulation"

"A problem of utmost importance—if not the most serious situation confronting the petroleum industry today—is the positive step taken toward government control and regulation as a result of the recent Supreme Court decision . . . Natural gas is the first of the nation's natural resources to be subject to socialistic regulation . . .

"The freezing of natural-gas prices and the assumption by the commission of jurisdiction over other contractual conditions, which in effect represents confiscation of private property without due process of law, can have only one result. That is to severely and immediately curtail the availability of new capital for the hazardous ventures of exploration, so that ultimately supply will be insufficient to meet consumer demands. Regulations designed for public-utility operations are completely unrealistic in light of the problems and current costs relating to maintaining and augmenting natural-gas reserves.

"It is essential that to protect natural-gas consumers and to forestall further encroachment of the basic American principle of free enterprise, corrective legislative action must be taken . . . It is recognized that without control natural-gas prices at the well will increase, but increases are both logical and necessary. Existing prices have only partially risen from the subnormal, distress levels prevailing before natural-gas



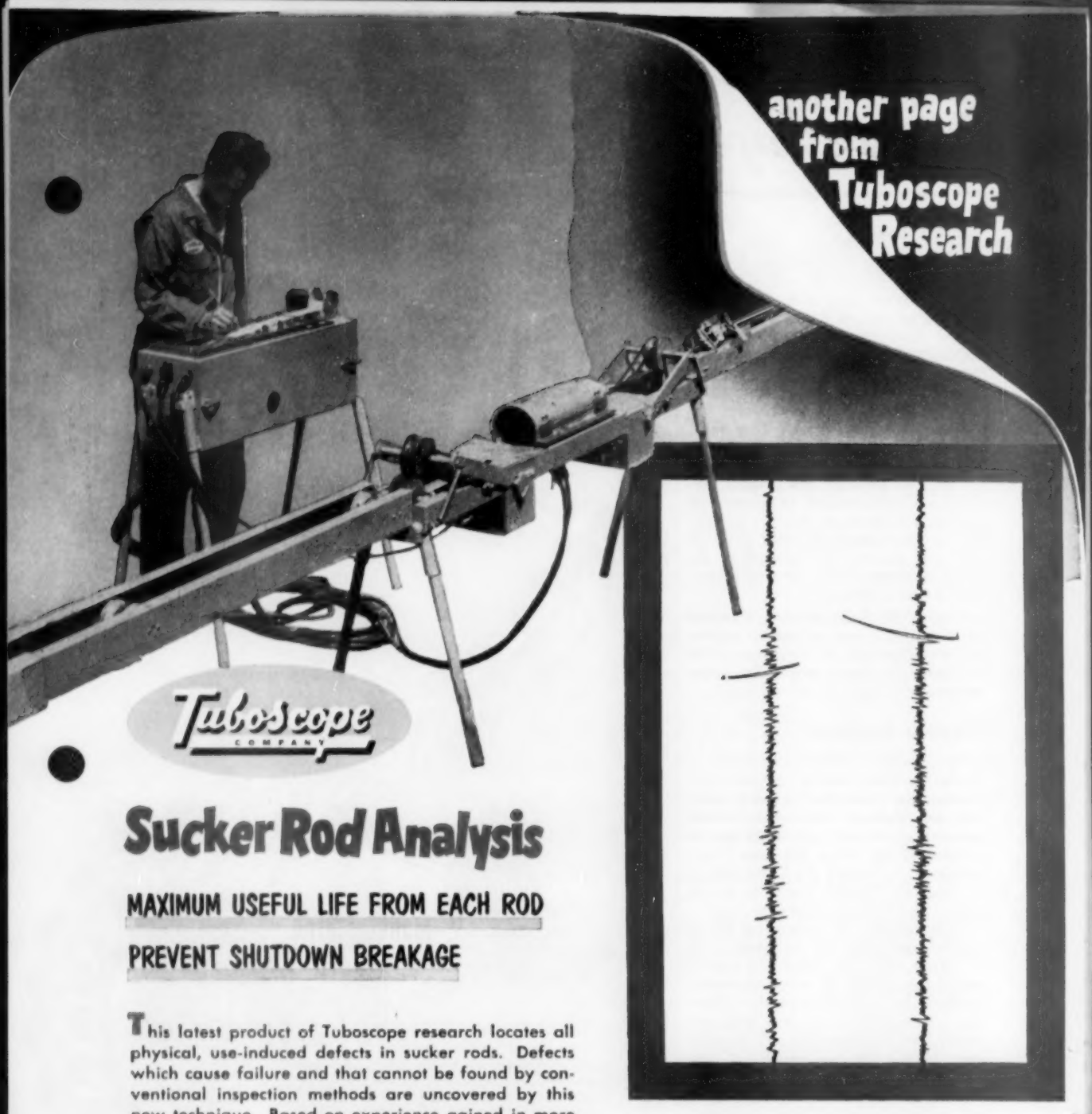
One reason that Otis' sub-surface controls enjoy such a good reputation for dependability is because high-quality manufacturing and workmanship is an inherent part of all Otis equipment. Otis prides itself on having one of the finest and most efficient manufacturing plants in the oil industry. That's why Otis tools continually give exceptional performance.

OTIS PRESSURE CONTROL SERVICE EQUIPMENT

Balanced Combination for Best Service: Manufacturing • Experience • Expert Engineering • Field Supervision • Research and Development • Production Control • Inventory Control • Coverage • Testing and Inspection

OTIS PRESSURE CONTROL, INC.

Branches Throughout the Oil Country



another page from Tuboscope Research

Tuboscope COMPANY

Sucker Rod Analysis

MAXIMUM USEFUL LIFE FROM EACH ROD

PREVENT SHUTDOWN BREAKAGE

This latest product of Tuboscope research locates all physical, use-induced defects in sucker rods. Defects which cause failure and that cannot be found by conventional inspection methods are uncovered by this new technique. Based on experience gained in more than five years practical experience with Sonoscope in adapting electronic non-destructive principles to the inspection of oilfield tubular goods.

Defects are recorded in permanent graph form, assuring uniformity of inspection and eliminating the chance of human error. Corrosion pitting, cracks, handling defects or radical strength variations in the material, due to improper normalizing, are all charted accurately. Breakage of rods, shut-down time and loss of production are reduced by this inspection. Ask your Tuboscope man to show you the savings from periodic rod inspection of your wells.

TUBOSCOPE COMPANY

2400 HOLMES ROAD

HOUSTON, TEXAS

Our Service Is Your Protection.

*The trade marks Tuboscope and Sonoscope are registered in the U. S. Patent Office.

LEADER IN NON-DESTRUCTIVE TESTING IN THE PETROLEUM INDUSTRY

markets were developed and are still substantially lower than competitive sources of heat. They must rise to give effect to prevailing exploration, development, and production costs."

Union Oil Co. of California's 9 months report.

Gasoline Taxes

"There appears to be widespread misunderstanding as to the real nature of the federal tax on gasoline . . . It is a manufacturer's excise tax and it has never been levied as a tax for the use of highways. The combined level of federal and state taxes on gasoline is, in my opinion, now excessive, discriminatory, and unreasonably oppressive.

"The average state and federal taxes levied on gasoline now amount to at least 7½ cents per gallon. The current manufacturers' price is approximately 12 cents per gallon. It is obvious, therefore, that the over-all direct tax burden on gasoline is equivalent to more than 60 per cent of the manufacturer's price.

"It is manifestly unfair to expect the principal product of our industry to bear such a heavy burden of taxation . . ."

Joseph P. Walsh, general counsel of Sinclair Oil Corp. and chairman of the American Petroleum Industries Committee, in remarks presented to the President's Advisory Committee on a national highway program.

Selling Gas Up North

"The pattern of the thinking of northern states which recently have sampled the benefits of natural gas piped to them from the southwestern states is becoming clear. Texas and the other gas-producing states . . . are expected—and are to be compelled—to supply gas to northern points wherever and whenever needed, in whatever quantity needed, and at whatever price is imposed upon them.

"An example of this viewpoint is a recent Milwaukee Journal editorial which takes the gas industry bitterly to task for its unwillingness to bow to federal regulation of gas prices at the well head . . . The attitude of the gas industry, it says, is that of the economic royalists and is taken without regard for the public welfare . . .

"Surely the population of Texas, Oklahoma, Louisiana, New Mexico, and other gas-producing states are a part of the public. Is the welfare of this great part of the public to be ignored, or subordinated to the welfare of states who want to get a valuable fuel at the cheapest possible price?

". . . We see no reason why the Southwest need be content to supply fuel to northern manufacturing communities at their own price merely because they have had a taste of its advantages and found it something to which they would like to become more accustomed."

Editorial in the Fort Worth Star-Telegram.

No Geological Impossibilities

Dear Sir:

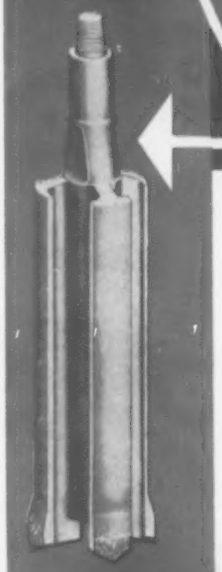
Just read M. T. Halbouty's and G. C. Hardin's capable article on the apprehension of thrust-faulting adjacent to a piercement salt dome at South Boling field, Texas Gulf Coast (*The Oil and Gas Journal, November 1, page 93*).

Nothing short of startling to read that some of their colleagues have labored under the delusion that ". . . thrust faulting in incompetent sediments is impossible." Cheers for Halbouty and Hardin for waking them from their long sleep.

Suggest that the "impossible" contingent looks at cross-sections in A.A.P.G. National Meeting Guidebooks for 1947 and 1952, published in Los Angeles. Plenty to think about in numerous other nationally published articles on Ventura basin and west San Joaquin Valley geology. One Ventura

DRILL LARGE DIAMETER HOLES THE MODERN WAY . . . WITH

SPANG FABRICATED STAR BITS



Progressive Operators Everywhere Are Discovering This Modern, Better Way Of Drilling Large Diameter Holes.

SPANG FABRICATED STAR BITS replace the conventional, old-style spudding bit and the big hole paddle-type bit. They are made in large diameters for drilling hard formations, and can be dressed, ready for drilling, by hard surfacing quickly and economically, thereby saving the time consumed heating and ramming. Made in a variety of diameters, lengths and weights, with any size joint desired, SPANG Fabricated STAR BITS are your assurance of profitable **big hole** drilling.

For Extremely Large Diameter Holes
SPANG PILOT-TYPE REAMER BITS ARE RECOMMENDED

PILOT-TYPE REAMER BIT

Field performance has amply proved these bits to be the driller's answer to **large hole** problems. They are made special, to your specifications and design, in any diameter; size and weight limited only by the handling capacity of conventional drilling rigs. They can be furnished to run on drilling stem or with integral rope socket top.

For detailed information on SPANG Fabricated STAR BITS and SPANG PILOT-TYPE REAMER BITS for big hole drilling, plus 52 page CATALOG, consult your nearest SPANG DEALER or write direct to

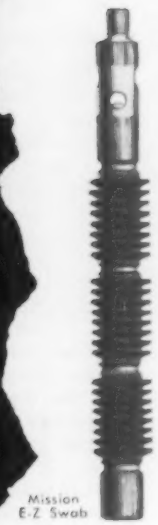
The HIGHER STANDARD

SPANG & COMPANY

Dept. O-1 BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.

More Than a



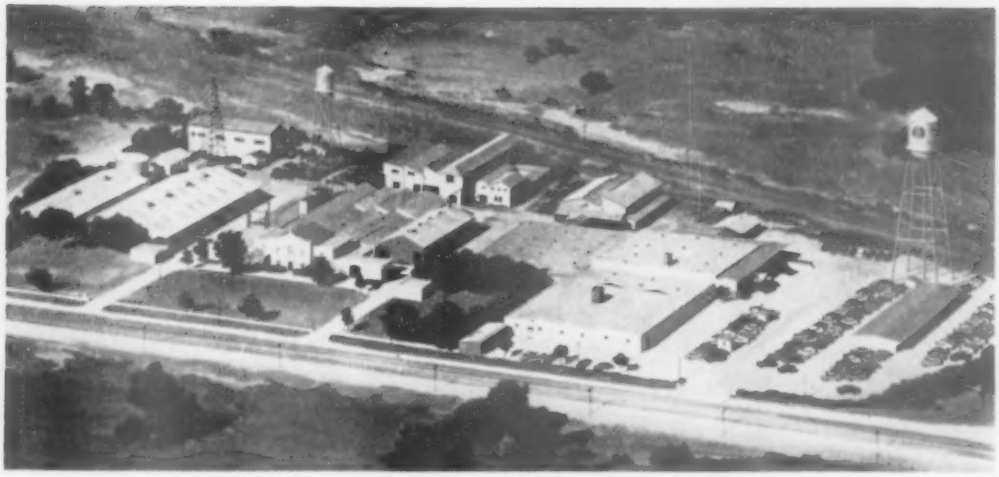
Mission E-Z Swab

Mission Valveless Swab

When this advertisement appeared twenty-five years ago in the first issue of Petroleum Engineer it showed one of Mission's three main products. In business for four years, prior to the time this advertisement ran, the company was already practicing the policies of service to the oil industry that have helped to make Mission the standard of quality in oil fields all over the world.

MISSION SALES COMPANY, INC. — 1929

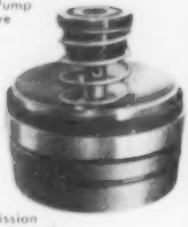
Quarter Century of Service



MISSION MANUFACTURING COMPANY — 1954

Mission Silver Top Slush Pump Valve

Mission Super-Service* Slush Pump Valve



Mission Mud Monarch Slush Pump Valve

Mission Automatic Lubricated Plug Valve

Mission's research facilities and engineering skill have kept pace with the oil industry during the past twenty-nine years. And, today this complete line of Mission products, manufactured in this modern plant located on 13 acres of land on Humble Road in Houston, are sold all over the world wherever oil is found. The extra care Mission takes in manufacturing, the extra care Mission takes in packaging ... so the Mission products get to you in perfect shape ... and the famous Mission guarantee, are familiar assurance that nothing but the finest will ever bear the name of Mission. So whether it is a complete line of slush pump parts, swabs, centrifugal pumps, plug valves, tubing spiders or rotary slips ... if the product you buy is made by Mission, you get the best. Always specify Mission to your supply store.

Mission Super-Chrome Piston Rod

Mission Self-Sealing Gland Packing

Mission Fluid End Piston

Mission Super-Service* Slush Pump Liner with Satin Finish*

Mission Rolling Dog Drill Pipe Slips

Mission Centrifugal Pump

MISSION MANUFACTURING CO.

P. O. BOX 4209 • HOUSTON, TEXAS

Export Office: 30 Rockefeller Plaza, New York

Mission Tubing Spider

* Trade Mark registered U.S. Patent office

COLD facts about a HOT subject . . .

Stewart Stoves

● Decide right now to replace make-shift heating facilities this winter with clean, safe, dependable Stewart Stoves.

Equipped with regular Stewart Hi-Efficiency B-4 gas burners—"The Burner without an equal"—Stewart Stoves provide plenty of heat at low cost, for derrick floors, warehouses, supply stores, garages, industrial plants, etc.

They are furnished for use with either natural, butane, propane or manufactured gas—furnished with or without vents.

Natural gas stoves furnished with gas valves, pilot light and pressure regulator. Butane stoves do not have pilot light and pressure regulator.

CONSTRUCTION: Bodies are heavy sheet steel. Rounded top, baffle plates and legs are cast iron. Finished with high temperature aluminum paint.

TWO SIZES:

Model 15: 50,000 BTU, 35" high by 19" O.D. Wt. 100 lbs.

Model 20: 150,000 BTU, 48" high by 24" O.D. Wt. 200 lbs.

When ordering, specify gas to be used.

It's wise to standardize with.. WECO

WECO ®

WELL EQUIPMENT MFG. CORP. • Division of Chikson Company • HOUSTON 1, TEXAS

basin field produces from unconsolidated Upper Pliocene gravels beneath a major thrust fault. Ventura basin chock full of thrust faults stacked deep in poorly consolidated sediments. Oil found above thrusts, in fault zones, below thrusts.

Nothing is impossible.

Robert H. Paschall,
Ventura, Calif.

Natural-Gas Legislation

"Oil and gas men at the Chicago convention of the American Petroleum Institute can find no fault with the view expressed by Jerome K. Kuykendall, chairman of the Federal Power Commission. He pointed out that . . . the commission has no choice except to act in accord with the June 7 decision of the Supreme Court . . .

"Several developments have taken place since . . . the FPC order. Some companies have refused to make new sales of gas to pipeline companies. One company has filed in a federal court in Tulsa an injunction suit against the Government . . . In Washington the Supreme Court has agreed to rule on whether Oklahoma has the right to regulate gas prices. The court's June 7 decision seemed to conflict with Oklahoma laws . . .

"Probably in the end Congress will have to settle this issue. Already Sen. Price Daniel of Texas has promised to introduce a bill that would nullify the June court decision . . . Such a step is needed to free the gas producers from bureaucratic control in Washington, which might lead to socialization of this import resource."

Editorial in the Dallas Morning News.

Will the Government Drill?

"The effect of regulated field prices for natural gas will be . . . to slow down new discoveries of gas, creating shortages, and finally raising the consumer's gas price or leaving him high and dry without a source of the supply . . .

"Then when gas reserves dwindle, and supplies run low, would it be proposed that the federal Government use tax money to engage in the highly hazardous business of sinking holes to search for oil and gas?

". . . A government program which would curtail supplies and encourage higher prices for both oil and gas cannot serve the public interest, either from the standpoint of the household consumer or . . . from the standpoint of national defense. . ."

Edward A. Amar, Hammond, La., president of the Louisiana Oil Marketers Association.

do...

make all repairs on location."

All parts of Gardner-Denver Mud Pumps can be replaced on location

You can avoid the excessive expense of hauling your mud pump to a machine shop for repairs and renewal of parts when you have a Gardner-Denver Mud Pump on the job.

CONTINENTAL

Serving the Oil and Gas Industries

digging

The Biggest Gas Line Ever Built

IN THE MOJAVE DESERT east of Barstow, California this Cleveland "320" Trencher is making the final cut, 4-ft. wide, 7½-ft. deep, for Pacific Gas and Electric Company's 34" "Super Inch" pipeline—reportedly the largest gas transmission line ever built.

On nearly every major pipeline construction project throughout the world you'll find Cleveland trenchers setting the pace. And on the majority of smaller trunk lines, gathering lines, lease lines, etc. you'll find Clevelands leading the way too. Pipeliners, large and small, will tell you Clevelands are *"Good . . . Everywhere"* because they dig *more trench—in more places—at less cost.*

There are Cleveland models for every size and kind of pipeline trenching and backfilling. Get the latest "dope" on them now—from your local distributor or by writing to:

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO

CLEVELAND

CALENDAR

NOVEMBER

28-Dec. 3 American Society of Mechanical Engineers, Statler Hotel, New York.

DECEMBER

2-4 Interstate Oil Compact Commission, winter meeting, Drake Hotel, Chicago

2-4 American Chemical Society, Southwest Regional meeting, Fort Worth, Tex.

3 Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.

12-15 American Institute of Chemical Engineers, annual meeting, Statler Hotel, New York.

1955

JANUARY

17-18 Kansas Oil Men's Association, annual convention, Baker Hotel, Hutchinson, Kans.

17-19 Pipe Line Contractors Association, annual convention, Hotel Statler, Los Angeles.

26-28 Symposium on instrumentation for process industries, A. & M. College of Texas, College Station, Tex.

27-28 American Chemical Society, symposium on hydrocarbon chemistry, Rice Hotel, Houston.

27-28 Southern California Meter Association, fourth annual instrument short course, Los Angeles Harbor Junior College, Wilmington, Calif.

FEBRUARY

13-17 American Institute of Mining and Metallurgical Engineers, annual meeting, Conrad Hilton Hotel, Chicago.

13-18 A.S.T.M. Committee D-2 on Petroleum Products and Lubricants, Rice Hotel, Houston.

14-16 Rocky Mountain section of A.A.P.G., annual regional convention, Billings, Mont.

16-18 National Association of Corrosion Engineers, sixth annual short course for pipeliners, Mayo Hotel, Tulsa.

25 National Gasoline Association of America, Permian basin regional meeting, Scharbauer Hotel, Midland, Tex.

MARCH

4 Southern Gas Association, transmission management conference, Shamrock Hotel, Houston.

7-11 National Association of Corrosion Engineers, Palmer House, Chicago.

9-11 American Petroleum Institute, Division of Production, Southwestern spring meeting, Jung Hotel, New Orleans.

17-18 Southern Gas Association, Distribution Management Conference, Jung Hotel, New Orleans.

23-24 Pacific Coast Gas Association, accident prevention conference, Santa Barbara, Calif.

23-25 American Petroleum Institute, Division of Production, Mid-Continent District, Herring Hotel, Amarillo, Tex.

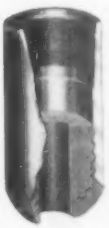
24-25 American Gas Association, gas supply, transmission, and storage conference, Wm. Penn Hotel, Pittsburgh.

27-29 Texas Independent Producers and Royalty Owners Association, ninth annual meeting, Hotel Texas, Fort Worth.

28-31 American Association of Petroleum Geologists, Society of Exploration

BAKER IS "STILL "FIRST"...

This is Product No. 100—Baker Cement Float Shoe—outstandingly "First" for the safe guiding, floating and cementing of casing. No other shoe can approach its world-wide popularity. Available also in the "whirler" type at a nominal increase in price.



This is Product No. 102—Baker Cement Guide Shoe—used in combination with a Baker Cement Float Collar when one float valve is considered sufficient, and a stop for the cementing plug is desired above the shoe. Also used in combination with Baker FILL-UP Collars or FLEXIFLOW Collars.

This is Product No. 101 M&F—Baker Cement Float Collar, usually positioned just above the shoe joint to provide a "stop" for the cementing plug. Used in combination with any type of Baker Cement Float Shoe, Guide Shoe, or "Whirler" Shoe, selected to meet the customer's specifications.

This is the new Baker Differential FILL-UP Shoe—Product No. 1081—which permits the casing to fill automatically from the bottom (while it is being run) to within 90% of the fluid level of the annulus. By using *both* the FILL-UP Shoe and its companion FILL-UP Collar, an 81% fill is secured. It's new—ask for brochure.

This is the new Baker FLEXIFLOW Fill-Up Shoe—Product No. 160. This feature is also available in a Collar and a "Whirler" Shoe. Permits the casing to fill automatically from the bottom through a flexible, variable orifice—eliminates messy intermittent surface filling, as well as casing overflow—saves landing time and drilling mud—reduces the damaging "Ram Effect." Ask for brochure describing the new FLEXIFLOW Equipment.

The "First" Name in Guiding, Floating and Cementing Equipment

"FIRST" in the Field—Baker "pioneered" the development and marketing of Guiding, Floating and Cementing Equipment. Baker always has maintained the lead, and is today still "First" in the Field.

"FIRST" in Successful Results—Success in cementing means only one thing—to secure a permanent, leakproof shut-off with the initial cement job. Baker Equipment offers you the best possible opportunity to secure Successful Results. Accurate threads; the rounded nose on all shoes to guide the casing safely; the efficient Baker Buoyant Ball Valve which seals instantly against the rubber seat when pressure is reversed; the minimum cross-sectional area of "drillable" materials (no metal)—all combine to make Baker "First" in Successful Results.

"FIRST" and ONLY "Whirling" Action provided by baffled side ports in all "whirler" type shoes and collars to wash the formation and then whirl the slurry to aid in perfect bonding of the slurry with the formation.

"FIRST" with new and improved products—such as Baker Differential FILL-UP Equipment and Baker FLEXIFLOW Fill-Up Equipment which permit the casing to fill from the bottom automatically as it is being run. You save time in landing casing—reduce the "Ram Effect" which breaks down potential lost circulation zones—eliminate the hazards and discomfort of surface filling the casing. Ask any Baker representative or office for brochures describing Differential FILL-UP and FLEXIFLOW Fill-Up Equipment.

"FIRST" in Popularity because you (and thousands of other operators) have recognized tools and methods which provide *dependable performance*. It is both a challenge and an inspiration to work with men who *insist upon results*—a challenge to supply their present needs, and an inspiration to anticipate their demands of tomorrow. Baker will always be ready—"First" with what you need!

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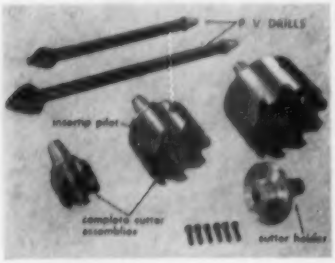
MODEL 660 TAPPING MACHINE*

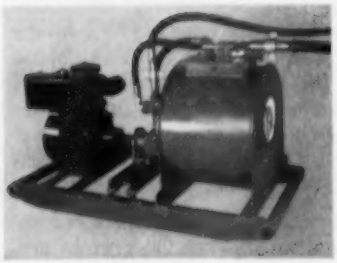
WmSON INSERTOOTH CUTTERS, INSERTIP DRILLS AND PILOTS HAVE TOOL STEEL CUTTING EDGES



P. V. DRILLS MAKE TAPS AS LARGE THROUGH **PLUG VALVES** AS DO STANDARD CUTTERS THROUGH GATE VALVES.

INSERTIP PILOT EQUIPPED WITH SPRING LOADED STEEL BALLS TO HOLD COUPON IN CUTTER.

COMPLETE HYDRAULIC DRIVE FOR MODEL 660 TAPPING MACHINE



UPPER PHOTO: COMPACT HYDRAULIC MOTOR & CONTROL VALVE REPLACE AIR MOTOR ON TAPPING MACHINE.

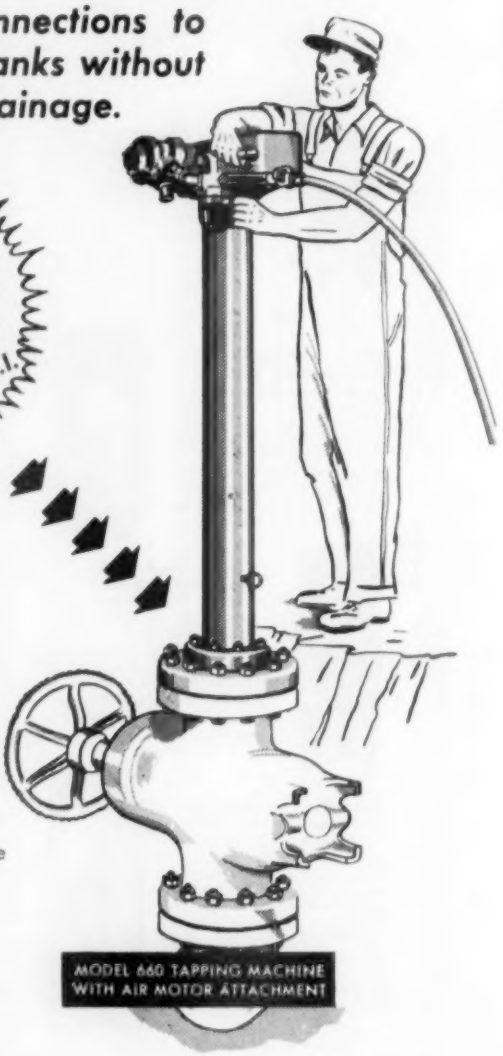
LOWER PHOTO: ENGINE-DRIVEN HYDRAULIC PUMP, SKID MOUNTED WITH FLUID TANK, SUPPLIES POWER TO HYDRAULIC MOTOR THROUGH 50 FT. HOSES.

for making connections to pipelines and tanks without shutdown or drainage.

ASA 600# RING JOINT FLANGE PERMITS **PRESSURES** TO **1,440 P.S.I. @ 100° F.** **TEMPERATURES** TO **700° F. @ 700 P.S.I.**

★ 42" TRAVEL LENGTH OF BORING BAR *permits . . .* **PIPE TAPS TO 14" TANK TAPS TO 16"**

★ CHOICE OF POWER compact air motor or complete hydraulic drive (including engine driven pump) provides dependable lower cost power.



MODEL 660 TAPPING MACHINE WITH AIR MOTOR ATTACHMENT

* Patent No's. 2,679,173—2,097,398

there is a WmSON-HILLCO tapping machine for your specific needs . . .

MODEL 100	MODEL 300	MODEL 1200
MAX. DRILL SIZE, 2"	MAX. CUTTER SIZE, 4"	MAX. CUTTER SIZE, 24"
TESTED TO 2,400 P.S.I.	*TESTED TO 2,175 P.S.I.*	*TESTED TO 2,175 P.S.I.*

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Geophysicists, and Society of Exploration Paleontologists and Mineralogists, annual meeting, Hotel Statler, New York.

MARCH 28—APRIL 1

American Society for Metals, ninth Western Metal Exposition and Congress, Pan-Pacific Auditorium, Los Angeles.

APRIL

13-15 Natural Gasoline Association of America, annual convention, Baker and Adolphus hotels, Dallas.

13-15 American Society of Lubrication Engineers, tenth annual meeting, Hotel Sherman, Chicago.

19-20 Pacific Coast Gas Association, distribution conference, Phoenix.

19-21 Southwestern Gas Measurement Short Course, North Campus, University of Oklahoma, Norman, Okla.

28-29 American Petroleum Institute, Division of Production, spring meeting of Pacific Coast district, Statler Hotel, Los Angeles.

MAY

1-4 Liquefied Petroleum Gas Association, annual convention, Conrad Hilton Hotel, Chicago.

1-4 American Institute of Chemical Engineers, Shamrock Hotel, Houston.

9-10 American Gas Association, Gas Supply, Transmission and Storage Conference, Hotel William Penn, Pittsburgh.

9-12 American Petroleum Institute, Division of Refining, midyear meeting, Jefferson Hotel, St. Louis.

11-12 Pacific Coast Gas Association, gas supply and transmission and conference of technical session, Palm Springs, Calif.

14-22 World Wide Chemical Plant and Equipment Exposition and Congress, Frankfurt Germany.

16-18 American Petroleum Institute, Division of Transportation, products pipeline conference, Edgewater Beach Hotel, Chicago.

16-18 Southern Gas Association, New Orleans.

23-25 American Petroleum Institute, Division of Marketing, midyear meeting, Chase and Park Plaza hotels, St. Louis.

26-27 Kentucky Oil and Gas Association, annual meeting, Lafayette Hotel, Lexington.

MAY 30-June 1 Chemical Institute of Canada, thirty-eighth annual conference and exhibition, Quebec City, Que.

JUNE

5-9 Canadian Gas Association, annual meeting, Sheraton-Brock Hotel, Niagara Falls, Ont.

6-10 American Petroleum Institute, Division of Production, midyear committee conference, Brown Palace Hotel, Denver.

6-15 Fourth World Petroleum Congress, Rome, Italy.

9-10 Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont.

9-10 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

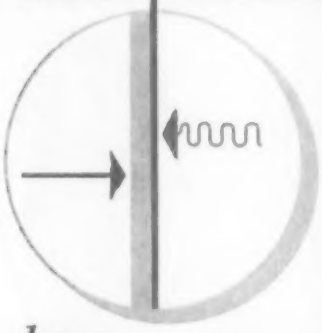
16-18 Interstate Oil Compact Commission, Denver.

JUNE 28-JULY 1—

American Society for Testing Materials, Chalfonte-Hadden Hall, Atlantic City, N. J.

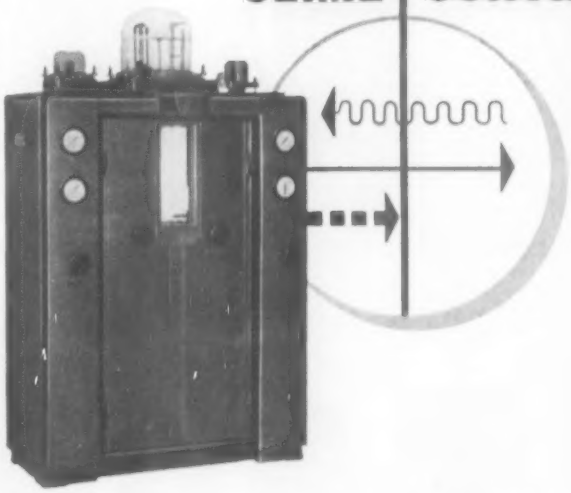
Where you need

HEAT | EXCHANGE



Be sure you have

SLIME | CONTROL



Whether you heat or cool water for make-up, process or any other use, you will need Wallace & Tiernan Chlorination to help combat slime problems introduced by water-borne bacteria or air-borne bacteria.

With slime control equipment designed for any need, built for lasting and dependable service, highly accurate and backed by over 40 years of successful application experience, Wallace & Tiernan Chlorination can help you increase the efficiency of your plant and cut operating costs. For further information write our Industrial Division.

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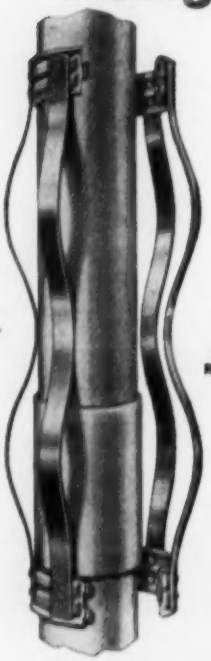
Now LARKIN

Designed and proved to meet

Long LOK-ON Range "T"

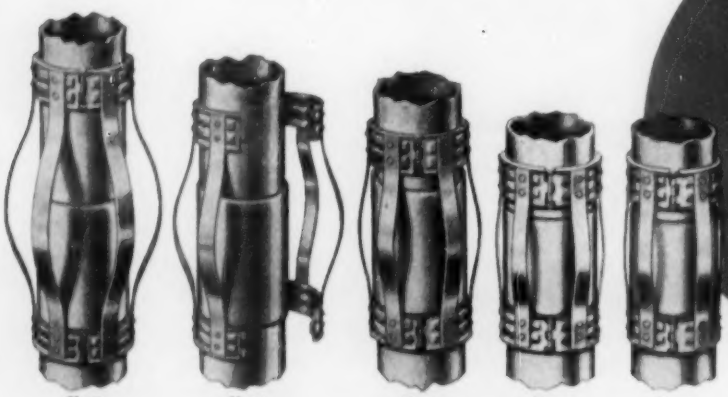


Long LOK-ON Range "S"

Long LOK-ON Range "R"

Long LOK-ON Range "Q"

Long LOK-ON Range "P"



Short LOK-ON Range "T"

Short LOK-ON Range "S"

Short LOK-ON Range "R"

Short LOK-ON Range "Q"

Short LOK-ON Range "P"

LONG LOK-ON CENTRALIZER

The Larkin Long Lok-On Casing Centralizer exceeds every known requirement for centralizer performance. To install, LOK-ON around the casing coupling. If other positioning is desirable, plug-welding lugs for this purpose are furnished with each centralizer.

SHORT LOK-ON CENTRALIZER

The Larkin Short Lok-On Centralizer is an economical means for centering the shorter strings of casing in undeviated holes. It is being satisfactorily used in many shallow producing areas.

In the development of these superior centralizers, Larkin engaged the services of a firm of consulting engineers with an established record for ability and integrity, and with a wide range of experience in the developing and designing of oil field equipment. The purpose of this step was two-fold:

1. **To bring the benefits of their experience, their technical ability, and their excellent contacts with oil company engineers into co-ordination with the work being done by Larkin's own engineering department.**
2. **In view of confusion arising from contrasting claims, to be able to place before centralizer users, in certified form, an unbiased and well-documented report, that could be accepted on its merits without regard to purely commercial considerations.**

Every test made in the development of Larkin Centralizers was observed by oil company engineers.

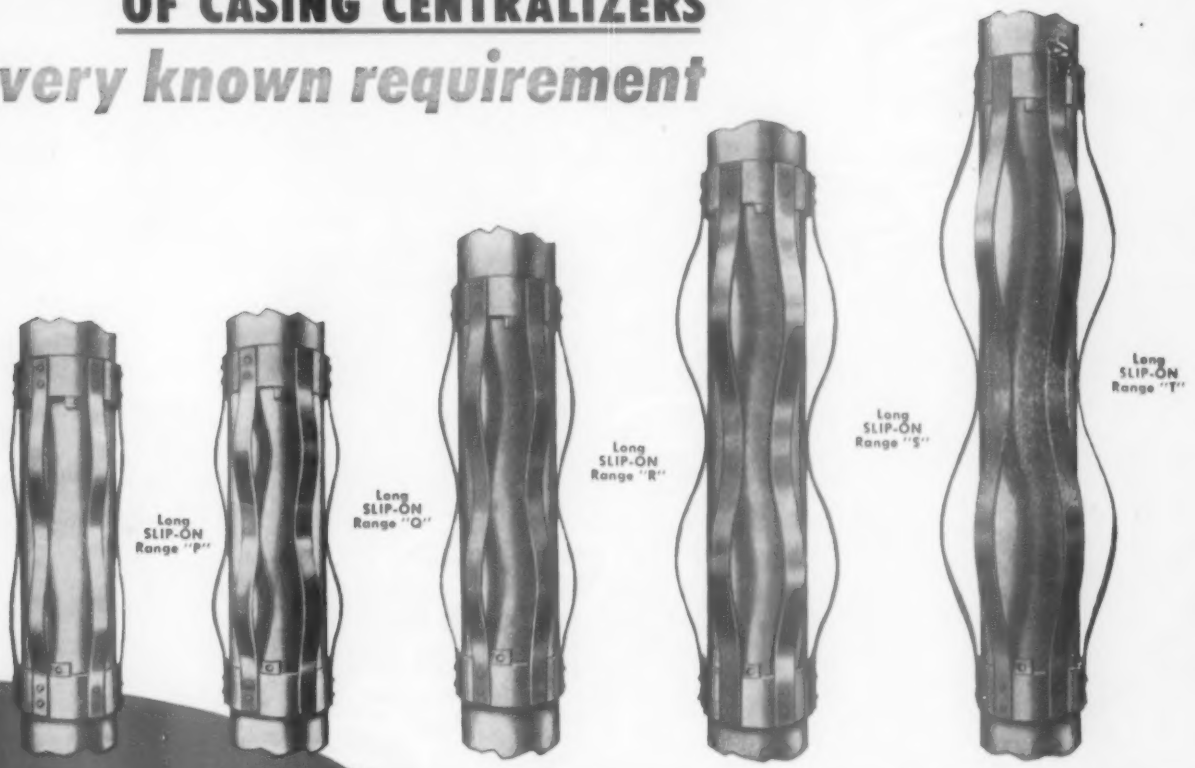
The first step in the development of Larkin Casing Centralizers was to consult with the engineering departments of a large list of oil companies and get their views on what should be expected of a high performance centralizer. The many constructive suggestions thus received were consolidated and our engineers set out to design a centralizer that would meet or exceed the maximum stated requirements. After more than three years of research and testing the final design was established and now a centralizer of truly superior performance is available in a series of ranges and types to suit any well condition, any method of installation, (Slip-On or Lok-On), or to satisfy any need for economy.

FIVE RANGES FOR MAXIMUM EFFICIENCY

Maximum efficiency in a casing centralizer requires a carefully calculated relationship, between the bowed height of the spring and the length of the spring. Therefore, the overall length of centralizers in the various ranges will vary with the size of the hole in which casing of a given size is run. The Range "P" might appear to be rather short just as the Range "T" might appear to be unnecessarily long, but each

OFFERS THE FIRST COMPLETE SELECTION OF CASING CENTRALIZERS

every known requirement

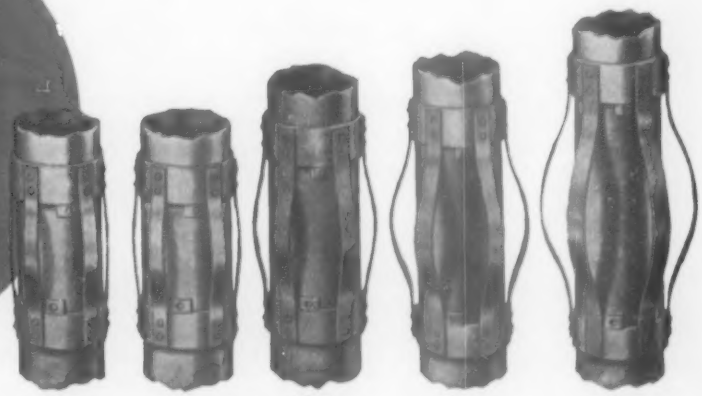


LONG SLIP-ON CENTRALIZER

The Larkin Long Slip-On Casing Centralizer is a counterpart of the Larkin Lok-On with the exception that it is always positioned between the casing couplings rather than around them. Where well conditions or personal preference require this type of installation, it is the ideal centralizer.

SHORT SLIP-ON CENTRALIZER

The Larkin Short Slip-On Centralizer is an economical unit designed for "between the couplings" installation. It is completely satisfactory for use on shorter strings in undeviated holes.



Range is scientifically designed to give the operator what he expects from Larkin Centralizers.

IMPORTANT FACTS ABOUT LARKIN CENTRALIZERS

Larkin Centralizers take 45% less permanent set than the maximum usually allowed.

Larkin Centralizers have 300% more initial centering force than the minimum usually required.

Larkin Centralizers of properly selected range will start easily without bumping or snubbing.

HOW TO ORDER

Refer to Selection Charts in the new Larkin Centralizer Catalog and order by Fig. No., casing size and range.

For complete details write for catalog or contact your nearby Larkin representative.

50th Anniversary Year

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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Big Oil Man

WHO'S the biggest man in the oil industry? It's been suggested that we run a contest to find out, but it won't be much of a contest because it was inspired by a glance at a man who will have few runners-up.

Our candidate is George P. Ellison, Owensboro, Ky., president of the Kentucky Oil and Gas Association and manager of Producers Pipe Line Co. He says he's 5 ft., 17½ in. tall and weighs 268 lb. You see his white thatch scraping the ceiling at many a producers' gathering.

Ellison says he's a small independent producer, but he much prefers to talk about football. He played for McKendree College, Lebanon, Ill., and the University of Chicago in 1924 and '25. Then he turned pro, about the time that professional football was getting a good start, and played in the last game that the late great Jim Thorpe ever played. First he was with Portsmouth Steel Shoe Co. team, Portsmouth, Ohio, which later became the nucleus of the Green Bay Packers, and then with the American Rolling Mill team at Ashland until it was sold to Detroit.

He quit football in 1938 and went into the marketing department of the old Indian Refining Co. (later absorbed by Texaco) in Lawrenceville, Ill. He's been in the oil business ever since, but he still looks as though he could hold a line against any of today's gridiron great. Six feet five and a half, 268 lb.—know anybody in the oil business any bigger? Or shall we declare it no contest?

Volunteer Wells

AS if the industry weren't having enough troubles of its own making with too much oil at the moment, Mother Nature seems to be conspiring to make things worse. We have run across several recent instances of oil or gas popping out of the ground at unexpected—and sometimes unwanted—places.

Best advertised was that old gas well that came to life in a new residential area of Tulsa and which, we understand, got a sensational play in eastern newspapers which made it look as though half the town was about to be blown sky high any minute. It did cause considerable worry for a few days and forced one family to evacuate its gas-filled house, but classes went on as usual in the elementary school next door. Industry experts soon established that the house had been built over a gas well abandoned 20 years ago but not properly plugged. It didn't take long for a drilling crew to slant a hole from the back yard and kill the old well permanently.

Down in Corsicana, Tex., an oil well which had been abandoned perhaps 40 years ago suddenly began flowing oil in the middle of a highway. Here the cause was traced to a nearby water flood which went in an unexpected direction.

In an old shallow area of eastern Oklahoma an operator clearing a site for a drilling rig bulldozed the top off an old well he didn't know was there and it began yielding oil and gas. Instead of having to drill a new well he just cleaned out the old hole and was in business.

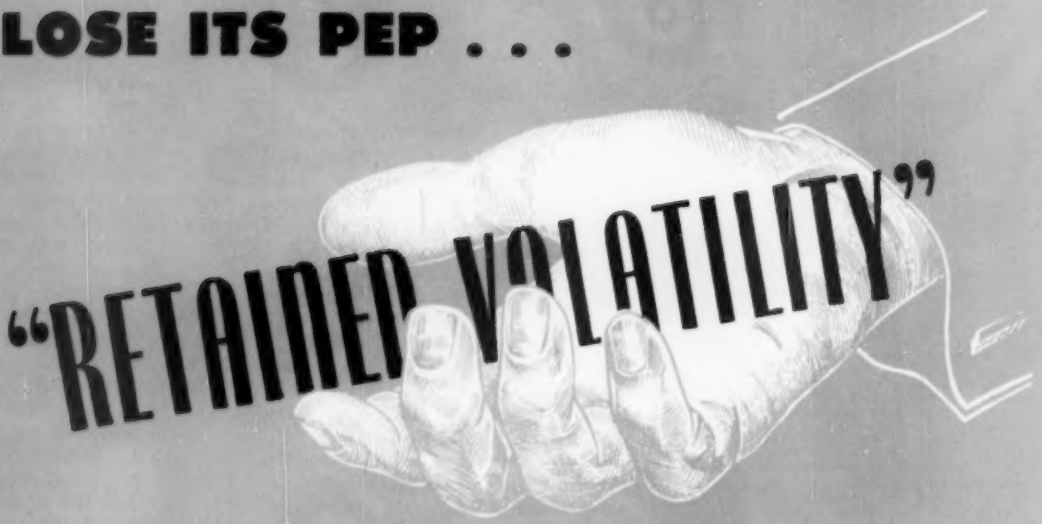
Things like that keep happening in many places as older areas are being reworked. Back in the early days, when oil was cheap and operators were looking only for a quick payout, a great many wells were abandoned long before they had yielded all their oil. Now some of them are coming to life again with only a slight—and often an involuntary—assist from man. Which goes to show that there's plenty of oil left to be produced in this country so long as conditions make it worth while to go after it.

Not Funny

NOW that the Interior Department has ruled that Kerr-McGee won't have to pay $15,000,000 for offshore leases it bid on by mistake, we can laugh at one of the biggest bloopers in recent oil history. But it's entirely possible that, some years in the future, these unwanted pieces of ocean bottom may yield a fabulous oil field, and then somebody else can have a good laugh.

Henry D. Ralph.

YOUR MOTOR FUEL NEEDN'T LOSE ITS PEP . . .



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Blending with Warren NATURAL GASOLINE will give it the RETAINED VOLATILITY so necessary for superior performance after it reaches the fuel tanks of your customers.

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How to handle more of too much

OIL'S outlook for the next year or so is an increase in demand of around 4 per cent but an ability to supply an increase of 15 or 20 per cent. This condition may continue for 2 or 3 years.

So the problem of how to deal with more of too much should be faced realistically.

Recognition of a problem is always the first step toward its solution, and the industry now is pretty well aware that it will have to live with standby capacity for some time. There is also rather general agreement on these points:

- Unlike some commodities, the over-all demand for petroleum products cannot be stimulated by lower prices (except, perhaps, over a very long period). Bargain-basement prices for oil won't work off the surplus or bring more of the idle capacity into use.

- By rights the industry should have higher unit prices to finance the carrying of its unused capacity, but if present price levels are maintained the reserve capacity can be carried without bankrupting the entire industry, though some operators may suffer.

- The load should be spread equitably by letting each producer and refiner have a fair share of the market.

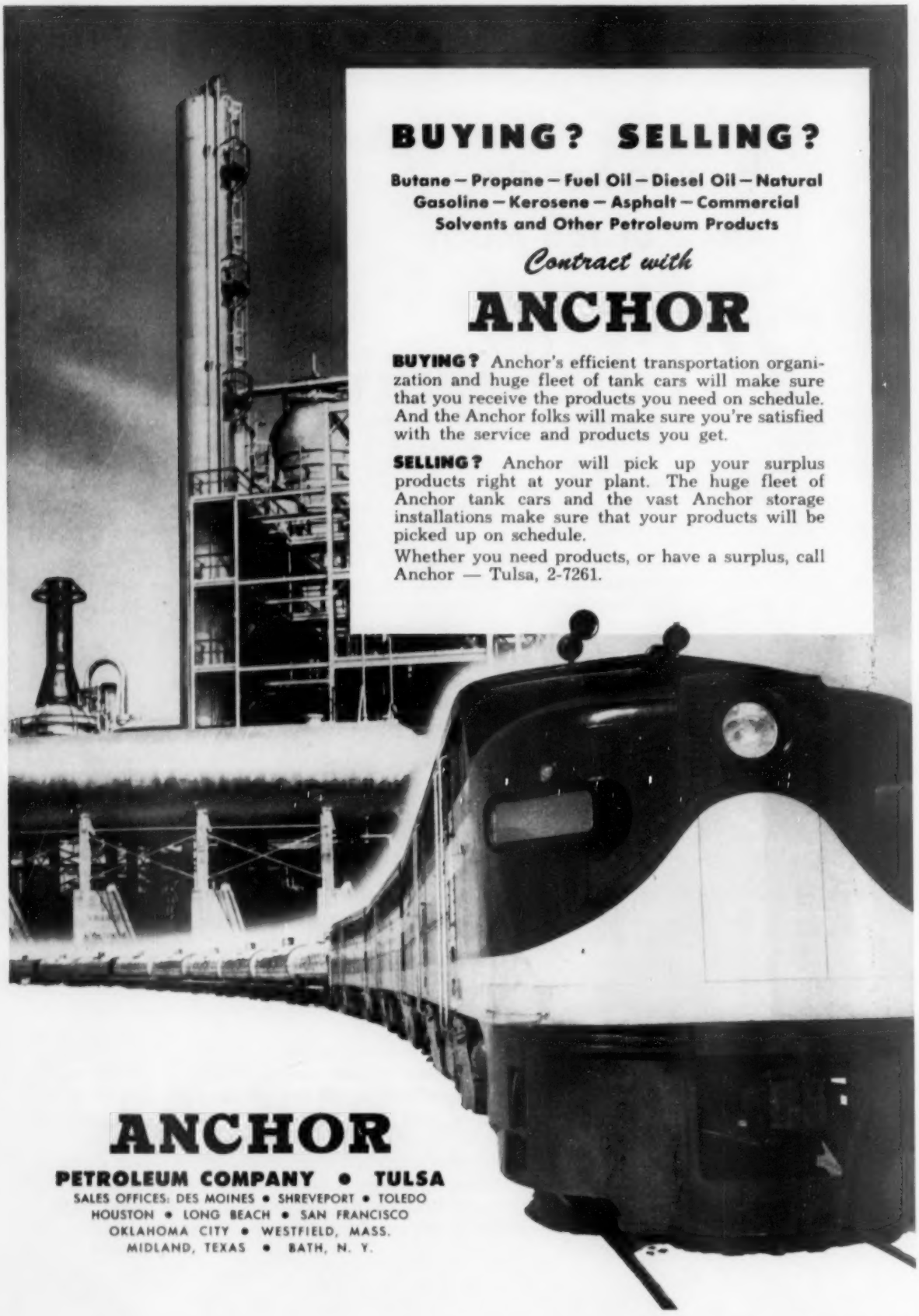
- The competitive urge to hog more of the market and keep one's own operations up to capacity threatens to make the oversupply bigger and the price structure weaker, and to crowd some operators out entirely.

THAT'S THE DIAGNOSIS. As for the treatment, everyone seems to think that somebody else should curtail operations. If this attitude prevails, the reserve cushion will become a millstone around the neck of the entire industry, drowning it in a flood of oil of its own making.

It won't take much self-denial to hold things steady. But it should be spread around. A little here and a little there will turn the trick. Moderation is the key.

Importers should all reduce their shipping schedules a little. Prorating states should stay close to their present output. Newer producing states should hold back part of their flush production, by proration laws or otherwise. Refiners should keep their runs and stocks in line with consumption. Marketers should curb their appetite for mere gallonage.

It boils down to self-restraint or self-destruction. In the recent words of one industry leader: "Among the many freedoms our industry has is the freedom to commit economic suicide. Self-destruction is a privilege—though not a pleasure—in any really competitive economy."



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THIS WEEK... ...IN THE NEWS

NEW AND THE OLD are shown in this one photograph of a new and prolific producer almost in the shadow of California's 25-year-old Signal Hill field which can be seen in the background. The well, Hancock Oil Co. 52 Signal, was completed flowing 1,922 bbl. daily through a 36/64-in. choke. It is one of seven such wells in the Long Beach airport area that have been brought in since The Texas Co. discovered a new 8,000-ft. pay and started other operators offset drilling along Long Beach's "Supply Row."

EXPLORATION—The $5 millions Cities Production Corp. and Forest Oil bet on trend geology paid off with the hottest strike in West Texas on Dora Roberts Ranch. . . . ¶Pacific section of A.A.P.G. is told 11 oil discoveries in California's coastal area this year cost an average of $840,000 each. . . . ¶S.E.G. president Paul Lyons warns midwestern geophysicists their field is slipping and they'll have to improve interpretation of seismic data to make it more attractive to the oil industry. . . . ¶Frio County, Texas, has fifth Austin chalk discovery of 1954. . . . ¶Texaco Ellenburger test in West Texas is completed as 1,699-bbl. Fusselman discovery. . . . ¶Western Kansas has first Arbuckle lime-oil production in Scott County. . . .

INTERNATIONAL—Petrofina acquires controlling interest in International Egyptian Oil Co. . . . ¶Legislation clearing the way for additional oil development in Brazil proposed by lawmaker. . . . ¶Disputed boundary between Saudi Arabia and the Trucial Coast to be settled by arbitration. . . . ¶New productive zone is found in fast-growing Wafra field. . . . ¶Products line competing with government-owned railroads being considered in South Africa. . . . ¶New company files for big concession in Philippines. . . .

INDUSTRY—New Orleans federal court steps in to delay FPC regulation over two gas producers. . . . Magnolia and Ohio Oil Co. both secure court orders to halt enforcement of FPC Order 174-A. . . . ¶O.W.I.U. renounces its no-strike pledge and plans to renew demands for a 5 per cent wage increase. . . . Union head Jack Knight visualizes strike force of 300,000. . . . ¶Forecast for imports during first quarter of 1955 indicates an increase of 11.23 per cent over 1954 first quarter average. . . . ¶New synthetic zeolites developed for use as adsorbing material. . . . New Molecular Sieves promise important commercial uses in oil and natural-gas processing. . . . ¶West Central Texas drilling contractors look to portable rigs as their best chance to cut costs and make a profit. . . .

OFFSHORE—Interior returns Kerr-McGee's $3-million deposit filed in offshore leasing error. . . . Humble and Gulf get two of tracts mistakenly won by Kermac. . . . ¶Texaco awards drilling contract for its first test off Texas coast to Kermac. . . . ¶Pacific Coast geological societies told dynamite more economical for offshore seismic work than black powder. . . .

PIPELINES—Service Pipe Line sets new pipe-laying record in completing 625-mile crude line from Fort Laramie, Wyo., to Freeman, Mo., in just a few days more than 3 months. . . . ¶Oil Basin Pipeline begins moving products through new 230-mile, 8-in. line from Laurel to Glendive, Mont. . . . Line will be used by Carter Oil and Farmers Union Central Exchange. . . .

PRODUCTION—Railroad Commission raises allowable for second consecutive month and places production on 16-day schedule for first time since July. . . . December allowable set at 2,961,782 bbl. . . . ¶First of three pilot projects proposed for Pegasus field started as gas is injected in Pennsylvanian. . . . Flood of Pennsylvanian will start in early December near center of unit and flood in Ellenburger will start shortly after first of the year. . . . ¶Accounts of successful water floods in North Texas are expected to influence operators toward wider use of secondary recovery.

$5 Million Gamble Pays Off

Two companies bet on trend geology—make biggest strike of '54 in West Texas

Norman Morrisey

MIDLAND.—Cities Production Corp. and Forest Oil Corp. gambled $5 millions on trend geology in West Texas and won.

The two combined sound geological thinking and an astute business deal and came up with the Dora Roberts Trend, the most significant strike in West Texas in 1954. That business deal included a lease arrangement that is unusual, to say the least.

The trend now has Ellenburger production at 13,000 ft. from a chain of key tests 17 miles long, extending from Headlee field to Sweetie Peck.

Forest and Cities Production touched off the campaign with a series of wildcats on their Dora Roberts Ranch lease between Midland and Odessa. British-American Oil Producing Co. and Warren Petroleum Corp. have fanned the flames and made the play even hotter with their successful wildcats in what is fast becoming a prolific producing area.

Trend geology . . . Past experience has proved many producing fields lie along definite trends that can be traced for miles. Although fields on these trends are often separated by barren areas, the trend may extend across several counties. Many West Texas geologists considered Midland Farms, Headlee, Sweetie Peck and Pegasus fields related to the same or similar lines of folding.

Trend geology and meager subsurface control indicated that the Dora Roberts ranch was favorably located along this postulated line of folding.

Several companies cast wishful eyes at the ranch, but the price tag on the land controlled by the Dora Roberts Estate was more than they were willing to pay.

Before the discovery of Headlee, it was believed that Midland Farms, Pegasus and Sweetie Peck were closely related structures on the west side of the Midland basin. Headlee's discovery in August 1953 convinced geologists for Cities Production and Forest that this line of reasoning was correct.

The 19,000-acre Dora Roberts ranch was still unleased and lay along the line of folding. The geologists recommended that management lease the land in spite of the fact they had no seismic control to support their ideas on trend geology.

NINETEEN HEAVY-DUTY RIGS busy developing the Dora Roberts-Headlee trend make this skidding operation a familiar sight. This rig drilled the Dora Roberts Ranch discovery well.

Leasing the land . . . An income tax situation had put the Dora Roberts Estate in a position where any additional income was handed over to the federal Government with little or none retained by the estate. It remained for landmen and tax experts to work out a deal that was favorable to both the oil companies and the estate, and for Cities Production and Forest to back their geologists' reasoning with the necessary capital.

In August 1953, the two companies laid $5 millions on the line for a lease on the ranch. The oil companies acquired leases under the northeast and southwest quarters of each section, subject to a three-eighths royalty payment to the lessors. In addition, Forest and Cities Production were obligated to drill two Ellenburger tests.

Docia Brown and Eloise Waters and their husbands, owners of the ranch, assigned their mineral interests in the southeast quarter of each section of the ranch to the oil companies. Although the ranch covers approximately 19,000 acres, only three-fourths of the land is involved.

The ranch owners will eventually receive seven-sixteenths or about 44 per cent of all the oil produced if they develop the quarter sections they retained in fee. Forest and Cities Production will receive approximately 56 per cent of all the oil produced from the ranch, but will receive 75 per cent of the oil from the wells they drill and operate.

Seismic work after the leasing confirmed the structural trend and indicated several favorable leads. The string of successful wells is ample testimony to the success of their gamble.

The producing areas . . . There are three Ellenburger producing areas on or adjoining the ranch, the Virey and War-San fields, and the recently discovered Dora Roberts field. The Headlee field is only 3½ miles northwest of the 1 Roberts B-1 discovery well of the Dora Roberts pool. Headlee appears to be related closely to the Dora Roberts trend, either as a northwest extension or a parallel fold to the trend.

Drill-stem tests at The Texas Co. 1 Sallie Ratliff, 8 miles north of Odessa, indicate the first link between Headlee and Midland Farms, 16 miles to the northwest. The well's initial flow, 50-100 bbl. an hour, promises another Ellenburger field in the trend.

Ellenburger wells are deep, ranging from 12,500 to 13,500 ft., but are very prolific. The B-1 Roberts was completed for a daily output of 2,163 bbl. of oil. Several wells on the trend have tested over 1,000 bbl. of pipeline oil per day from 400-500 ft. of Ellenburger pay.

Current drilling activity . . . Nineteen heavy-duty drilling rigs are kept busy developing the Dora Roberts-Headlee trend. In addition to the Ellenburger pay, several wells have been completed as dual producers, either in the Devonian or Pennsylvanian. The 13,500-ft. wells are drilled in 100-120 days at an estimated cost of about $325,000 each.

Reserves . . . The size of the producing areas has not been established. It now appears likely that several fields will be developed, rather than one tremendous producing area. By most standards, however, each of these fields may cover a large area, and any one of them might be as large as Pegasus or Midland Farms. Pegasus, closest large Ellenburger field, has 8,880 acres proved with an average daily output of 20,030 bbl. Midland Farms, Ellenburger, although not yet defined, now covers 1,120 acres. Headlee is still in the early stages of development with 22 producers and no dry holes, and has nearly 4,000 acres proved or semiproved. It is already approaching major field status with optimistic reserve estimates of nearly 100 million barrels.

The newly discovered Dora Roberts field may develop into another Headlee. The initial test logged 200 ft. of pay and was 150 ft. higher than the nearest Headlee producer. Optimistic interpretation indicates that the Headlee and Dora Roberts fields may link up. If such is the case, the field will be 8 miles long and about 1½ miles wide. Estimated reserves for such a producing area are about 150 million barrels of oil.

Outlook . . . Discovery of production on the west side of the Midland basin has made this area the hottest in West Texas. It has proved that deep structures can be mapped by the seismograph and that 13,500-ft. Ellenburger wells are economic.

Operators are now trying to apply the lessons they have learned from the Dora Roberts trend in the finding of new oil.

Geologists look for three things on a prospect before drilling: favorable structure, a potential reservoir, and a source for the oil. All these conditions are fulfilled on the west side of the Midland basin.

The problem is to find another Dora Roberts Trend.

NIGHT WORK helped prepare river crossings for fast-moving spreads. This scene is the crossing of the Smoky Hill River about 8 miles east of Abilene, Kans.

Rivalry cuts costs, gives Service a . . .

New Pipe-Laying Record

IF you want to lay a pipeline faster, take advantage of the human competitive element.

That's what Service Pipe Line Co. did in building its 625-mile crude-oil line from Fort Laramie, Wyo., to Freeman, Mo., and the results speak for themselves.

Two contractors, using eight spreads, completed welding and coating on the big-inch crude carrier last week, just 61 days after the first dozer began clearing right-of-way. The average rate of pipe-laying, a little more than 10 miles a day, set a new industry record, including the hurry-up job of building the Big Inch and the Little Big Inch of World War II.

The entire project, from the actual decision to build the line to the input of crude oil in Wyoming and western Kansas, required only a few days more than 3 months.

How it was done . . . The line was laid without any bonuses for the contractors or penalty provisions for tardiness; it was done without any special organization within Service Pipe Line.

There was a normal incentive to hurry for both Service and its contractors, O. R. Burden Construction Corp., Tulsa, and H. B. Zachry Co., San Antonio. For Service there was the promise of greater economy of operation, available as soon as the line was completed. For the contractors there was the knowledge that delays would throw them into winter work and its attendant high costs and further expensive delays.

What the companies did was to pit two spreads against each other on the same segment of line, each spread responsible for laying pipe from its end of the segment to the middle. The result surprised the company and the contractors. Each spread superintendent, eager to prove his spread more competent than the opposing spread, pushed his unit not only to complete its allotted half of the distance but to attempt to gain more recognition by laying line on into the opposing spread's territory.

Service claimed a new record in the pipe-laying job, with the eight spreads welding 108.6 miles of pipe in 1 week and up to 17.4 miles in a single day. One of the spreads welded 3.64 miles of 24-in. pipe in 1 day.

Target date for completion was December 1. Last week some cleanup work remained, but it was obvious that Service's approach to the pipeline job had cut even its optimistic time schedule by 15 per cent.

What is involved . . . The line actually was built for and will be operated by Western Pipe Line Co., a wholly owned subsidiary of Service. It is of 20-in. pipe from Fort Laramie to Sterling, Colo.; 22-in. from Sterling to Natoma, Kans.; and 24-in. on to Freeman. The line has an initial capacity of 178,000 bbl., nearly twice the capacity of the 90,000-bbl. 12-to-16-in. system it replaces.

It connects with an extensive gathering system at Fort Laramie and will deliver Denver-Julesburg and Powder River basin crude to an existing line at Freeman.

Timetable on the Record-Setting Line

June:
- **4—First study started on Arapahoe project.**
- **28—First study started on new line separate from Arapahoe.**

August:
- **3—First aero-exploration flight.**
- **12—Decided to build separate line.**
- **18—First right-of-way option obtained.**
- **19—Bid requests, including full specifications, sent to contractors.**
- **20—First pipe shipped from mills.**
- **24—First survey party arrived in the field.**
- **26—First pipe received and unloaded.**
- **30—O. R. Burden unloaded first contractor equipment.**

September:
- **16—Clearing of right-of-way started.**
- **19—First pipe in ditch.**

November:
- **15—Final weld made; coating completed.**

Primarily the new project represents an economy move by Service, since the bigger-diameter pipe will enable the company to eliminate 10 booster stations now required to pump crude through the smaller system. It also will enable Service to increase its crude movement out of the Rocky Mountain area as production increases and demand for the output grows.

In addition to the economy involved, the completion of the record breaking project was pleasing to Service Pipe Line people for another reason—they will put their line into operation before the Arapahoe line is finished.

Service originally gave serious consideration to joining Pure Oil Co. and Sinclair Pipe Line Co. in building the 494-mile Arapahoe line, an 18 and 20-in. crude line which virtually parallels the Western line. Arapahoe, which runs from Merino, Colo., to Humboldt, Kans., was contracted before the Western line but will not be finished until late December.

The three companies disagreed over terms of ownership of the Arapahoe line, and on August 12 directors of Indiana Standard, Service Pipe Line's parent, decided Service should build its own line.

New construction expected . . . With the greater capacity eastward from Fort Laramie, Service is anticipating expansion of its gathering system in Wyoming, which now extends northward to the Montana state line.

A particular need for expansion exists in northeastern Wyoming, and it is expected that some provision will be made to collect crude available in the Williston basin.

Court Curbs FPC Order

Two companies get temporary stays in first legal tests of recently proclaimed authority over gas producers

NEW ORLEANS.—First court intervention in the raging dispute over regulation of natural-gas producers by the Federal Power Commission last week brought temporary relief to two producers.

The U. S. Fifth Circuit Court of Appeals in New Orleans issued decrees prohibiting the government agency from enforcing its Order 174-A against Magnolia Petroleum Co. and Ohio Oil Co.

Magnolia's case was the first court action curtailing FPC's recently proclaimed authority to control sales of gas going into interstate commerce. The much-disputed order placing thousands of independent natural-gas producers under FPC jurisdiction was issued by the commission last August following the U. S. Supreme Court ruling making Phillips Petroleum Co.'s interstate gas sales subject to government regulation.

In last week's rulings, Judge Wayne G. Borah issued temporary stays pending final hearing on petitions for suspension of the FPC order.

The court granted Magnolia's stay November 15, and Ohio got a similar order the following day.

Magnolia had asked that the FPC order be set aside. Ohio was seeking a stay and review of the order. Hearing in the cases has not been set.

Effect . . . Magnolia officials believe that the stay order permits them to exercise termination options in certain contracts—commonly referred to as escape clauses—which provide that the company can cancel its delivery contracts with interstate pipelines if FPC attempts to assume jurisdiction. Order 174-A forbids independent producers to stop deliveries without approval by FPC.

Stanolind Oil & Gas Co. has a petition for a similar injunction pending in federal District Court in Tulsa, which comes within the Tenth Circuit Court of Appeals. *(The Oil and Gas Journal, November 15, page 162).*

It is expected that other gas producers in the Fifth Circuit will now seek stay orders, and that many in the Tenth Circuit will do the same if Stanolind is successful. The Circuit Courts may not rule the same way, and in any event the issue undoubtedly will be taken to the Supreme Court.

Earlier case . . . Just a few days earlier Magnolia lost a somewhat similar case in the federal District Court in Houston, which is in the Fifth Circuit. This was a petition for a declaratory judgment to define Magnolia's position in the running controversy over injection of gas into La Gloria field, Texas.

Operators in La Gloria, supported by a conservation order of the Texas Railroad Commission, are attempting to exercise contract options to reduce deliveries of gas to Texas Illinois Natural Gas Pipeline Co. and to inject the gas into the producing formation to increase oil recovery. Texas Illinois and the city of Chicago have asked FPC to prevent this.

Magnolia's suit in this case was not directed against FPC specifically, but asked the court for a declaratory judgment establishing its right to reinject the gas instead of selling it.

The court declined to act on the grounds that declaratory judgment procedure is not the proper way to obtain judicial review of Order 174-A and because the specific problem of the La Gloria field is still pending before FPC. The court added that Magnolia cannot, through a declaratory judgment, escape being classified as a natural-gas company as Phillips Petroleum Co. was so classified by the Supreme Court.

All three companies alleged that the FPC order is unconstitutional. They contend that issuance of the order without prior notice or hearing denied them of their property without due process of law.

PIPE ENDS WERE PREHEATED with butane before welding when the atmospheric temperature fell below 45° F. Preheating was necessary because of the high content of carbon and manganese in the X-52 seamless pipe.

Molecular Sieves are a new . . .

Tool for Adsorption

George H. Weber

NEW YORK.—If you are drying gases, recovering ethylene, or removing hydrogen sulfide it is possible that a new adsorbing material called Molecular Sieves can help you to do a better job.

Research engineers of Linde Air Products Co., a division of Union Carbide & Carbon Corp., who have spent the past several years developing these unique crystals, have uncovered a number of potentially important commercial uses, many of them in petroleum and natural-gas processing. According to Linde, the synthetic zeolites possess many qualities that present commercial adsorbents do not have. They will selectively adsorb gases and liquids of certain molecular sizes and types. They show a high capacity at elevated temperatures and can be reactivated many times over.

What are they? . . . Zeolites are not new. They occur naturally and have found fairly wide use in water softening. Some natural zeolites were discovered to have outstanding adsorbent characteristics. These rare types have been of interest as laboratory curiosities, and their qualities prompted an investigation of possible synthesis at Linde's Tonawanda, N. Y., research center. The work proved successful and resulted in the Molecular Sieves.

The synthetics are composed of sodium, calcium, silicon, aluminum and oxygen which combine water of hydration to form definite crystal patterns. When these hydrated crystals are heated the water is driven off. Unlike other hydrates, the remaining crystal structure does not collapse or rearrange. The result is a dehydrated zeolite consisting of a network of crystals containing pores and cavities of exact uniformity, which were originally occupied by water of hydration.

How they work . . . Unlike the natural adsorbent zeolites, Linde's synthetics can be manufactured in quantity and complete uniformity at a cost making them economical in laboratory and plant use. Two types are now available: 4A and 5A. The first has pore openings of about 4 Angstroms diameter (sixteen-billionths of an inch). Small molecules like water, carbon dioxide, hydrogen sulfide, ammonia, ethane, ethylene, propylene, methanol and ethanol can enter the pores and be adsorbed on the surfaces of the relatively large crystal cavities. Larger molecules which have critical diameters greater than 4 Angstroms cannot enter the crystal structure and will not be adsorbed.

Type 5A has pore openings of 5 Angstroms which will admit all of the above molecules plus propane, n-butylene and other straight-chain paraffins, olefins and alcohols. But, none of their branched isomers can enter the Type 5A pores because their critical diameters are greater than 5 Angstroms.

The Molecular Sieve adds a new dimension to adsorptive separation by selecting first on the basis of molecular size and shape.

In addition, the synthetic zeolites show a pronounced selectivity for certain types of compounds. Since they were originally hydrated, they naturally show a strong tendency to recombine with water. They will effectively remove even small traces of water liquid or vapor from mixtures of other polar materials and are considered to be super-drying agents.

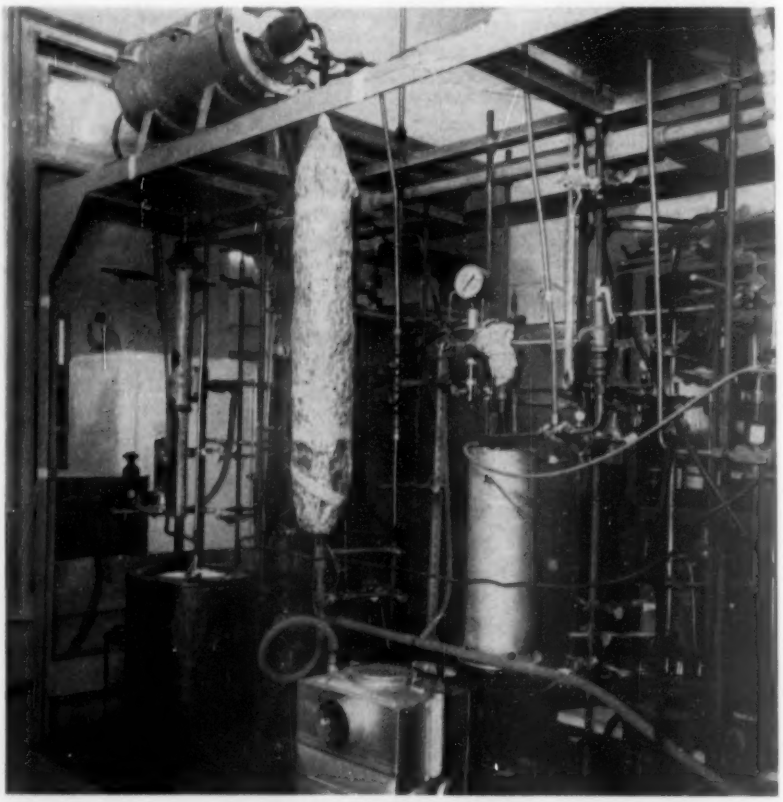
The Molecular Sieves have a strong affinity for other polar materials such as alcohols, carbon monoxide and hydrogen sulfide. They will adsorb these in preference to nonpolar molecules of the same size. Further selectivity is shown for unsaturated hydrocarbons over paraffins.

The Molecular Sieves can be used to remove hydrogen sulfide and carbon monoxide from certain gas streams, and to recover ethylene from mixed hydrocarbons, even when these components are present in small fractions.

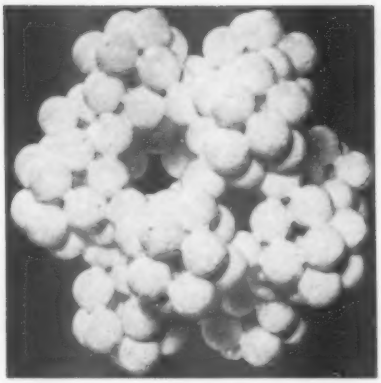
A particularly useful property reported by Linde is the capacity of the Molecular Sieves to adsorb relatively large quantities of a material that comprises only a small concentration in a gaseous or liquid mixture.

Type 4A can adsorb 19 per cent of its own weight of water from a gas having a relative humidity of only 2 per cent. This is roughly five times the capacity of silica gel and activated alumina under similar conditions. This property is retained at high temperature as illustrated by the fact that air can be dried at 212° F.

Probable uses . . . Although the developers made no comment directly, it is believed that eventually additional



A COMMERCIAL DRYING PROCESS is being duplicated here on laboratory scale. The adsorber is insulated to maintain a high operating temperature. Molecular Sieves may find important uses in laboratory work in research into the composition and properties of petroleum components.



MODEL of a single cell in a Molecular Sieves crystal shows pore openings left when water of hydration is driven off. Crystals containing millions of these cells are connected to form a network of pores and cavities. The crystal is about 50 per cent void volume.

Molecular Sieves types may be synthesized, possibly to admit cyclic molecules. This would extend their potential use to the separation of aromatics and naphthenes, and might provide a means for separation of various paraffin and olefin isomers.

Both types of material are now available in three forms: as a fine powder and as ⅛ and 1/16-in. diameter extruded rods. The material sells for $1.95 per pound.

In these forms, the new adsorption agent can be used directly in much existing equipment. It will react with aluminum when wet but no difficulty will be encountered with any other common construction material. The Molecular Sieves are not damaged by liquid water and are not easily deactivated or poisoned, but strong mineral acids will decompose them.

While fixed-bed cyclic operations are expected to be used in most commercial applications they may also prove adaptable to the continuous, moving-bed type of operation. They can be agitated with liquids in powder form and are also useful as static dryers or desiccants. They can be used in dynamic drying at high gas velocities and will super-dry air to dew points below —100° F. Because of their effectiveness at high temperatures, they can be used without removing the heat of adsorption, effecting a saving in equipment design and investment.

Because of their chemical structure, Molecular Sieves have exceptionally high ion exchange capacity. They are also believed to have important potential use in the field of catalysis. Their eventual employment in oil and gas processing will depend on the outcome of evaluation work now under way in many company research and development laboratories.

New Wage Drive Planned

Independent unions may join O.W.I.U. in winter campaign for 5 per cent pay boost; no-strike pledge is discarded

DENVER.—Armed with the threat of a nationwide strike, the Oil Workers International Union will renew its demands for a 5 per cent wage increase between now and January 1.

The new drive for higher pay, announced by President O. A. (Jack) Knight, could involve the combined membership of O.W.I.U. and a group of independent oil unions. Knight envisions a potential strike force of about 300,000 men.

Clearance for a possible nationwide strike against the oil industry was given by the O.W.I.U. policy committee in revoking its no-strike pledge announced last June.

"Since adoption of this program more than 5 months ago, negotiating committees representing various bargaining units within this union have requested wage increases from nearly every employer of any consequence with which we have bargaining rights," the committee declared at a meeting here November 11.

"These requests for wage increases have been flatly refused by all companies, excepting for a few very minor and small cases," the statement added. "There have been no general wage increases granted in the industry."

Knight said labor-management cooperation might have been established in the oil industry if companies had granted the requested 5 per cent wage hikes, "but the companies froze up and not a single one gave us a dime."

"We are disappointed," declared Knight. "Our patience is exhausted . . . If necessary, we will fight with the industry over it."

Knight refused to pinpoint a definite strike date in event the new negotiations are unsuccessful.

"We're not telegraphing our plans," he said crisply.

Background . . . In adopting the no-strike policy last June, the O.W.I.U. policy committee stated:

"On many occasions our employers have told us that they resent having to bargain 'with a loaded gun on the table,' by which they mean they resent bargaining under the pressure of strike threats.

"Therefore, on this occasion, we propose to 'unload the gun' and enter negotiations with an advance commitment not to strike for this increase."

But the experiment has failed, the policy committee decided. "We are reloading the gun," Knight added.

The O.W.I.U. president said the proposed merger with the Gas, Coke and Chemical Workers Union has nothing to do with the implied threat to strike. The two C.I.O. unions are scheduled to meet in Cleveland February 28 to

Pipelines Limited

Oil products are delivered to isolated fishing villages along the Gaspe Peninsula of Quebec by schooners, with an assist from small boats and horses. Schooners anchor in the St. Lawrence River and unload their oil cargo into small fishing boats. On shore, horses help drag the drums to market.

finalize the merger *(The Oil and Gas Journal, November 15, page 162).*

Amalgamation of these two unions would greatly increase the oil workers' potential strike force. The O.W.I.U. claims to represent approximately 120,000 workers for bargaining purposes, and G.C.C.W. claims about 100,000. Independent oil unions, with a combined representation of some 82,000 workers, could bolster the strike team considerably if they walked out.

The outlook . . . Indications are that a shutdown, if one is ordered, probably would come next spring *(The Oil and Gas Journal, November 1, page 56).*

The union chieftain pointed out that of about 700 O.W.I.U. contracts, "100 or more have expired." By the end of December, he said, agreements covering more than half of the union membership will have run out or will be up for re-negotiation. Expiration dates of the remainder fall in early or mid-1955.

Knight said nearly all the existing contracts contain a wage reopening clause, and that new demands for the 5 per cent wage increase will be made by the end of the year on all companies in which the union is bargaining agent.

Some or all of the 31 independent unions which have been considering a merger with O.W.I.U. may join in the new wage fight, Knight said.

"There is a possibility they may want a meeting to discuss this situation, but that's only a possibility now," he explained.

Twenty-one independents joined O.W.I.U. in its last nationwide strike in 1952 when approximately 50 refineries were shut down.

Wage statistics . . . The oil workers' last general wage increase was a 4 per cent boost in mid-1953.

The O.W.I.U. policy committee claims many American industries have granted pay hikes this year "in the face of declining profits." The oil industry, it contends, has refused to increase wages although it has enjoyed "increasing profits."

"Inasmuch as the oil industry has declined to increase wages during a period while other industries operating under generally poorer economic conditions have agreed to increase wages, we can only regretfully conclude that the oil industry is taking advantage of our pledge not to strike," the committee stated.

"By its behavior the oil industry has demonstrated that it does not want to establish wages on a basis of reason and equity, but that it will increase wages only when forced to do so by economic pressures."

Higher Imports Forecast

Figures given Railroad Commission show crude, products imports to jump 11 per cent during first quarter of '55

IMPORTS of crude and products for the first quarter of next year will be up 11.23 per cent over the average for the first quarter of 1954.

The total for the first quarter of 1955 was forecast at 1,159,600 bbl. daily by importing companies reporting to the Texas Railroad Commission. Actual imports by these companies averaged 1,042,500 bbl. daily in the first 3 months of 1954.

Total imports for the first quarter of 1954 averaged 1,123,300 bbl. daily. This total included imports by the companies reporting to the Railroad Commission plus consumer imports of finished products and imports by the Government. Reports to the Railroad Commission represented only 92.8 per cent of total imports.

If company estimates for the first quarter of next year account for the same percentage of the total as in the first quarter of this year, actual imports for the first quarter of 1955 may go as high as 1,250,000 bbl. daily.

Most of the increase forecast by the reporting companies was in crude. Company estimates of crude imports for the first quarter of next year represent an increase of 16.1 per cent over the same quarter of 1954 compared

Here's Companies Import Estimates

(Thousands of barrels daily)

	Actual		Estimated or forecast*				
	Sept. 1954	Oct. 1954	Nov. 1954	Dec. 1954	Jan. 1955	Feb. 1955	Mar. 1955
CRUDE—EAST COAST:							
Atlantic Refining Co.	78.5	60.0	60.8	60.8	60.8	60.8	60.8
Cities Service Co.	11.9	13.1	31.5	11.3	29.7	21.4	21.0
Eastern States Petroleum Co.	0.7	9.7	5.3	5.3	5.3	5.3	5.3
Gulf Oil Corp.	110.0	121.0	121.0	140.0	140.0	140.0	140.0
McBride Oil & Gas Corp.		3.4	7.0	6.4	6.4	7.2	6.4
Phillips Petroleum Co.	12.9	10.0	9.2	8.9	8.9	9.8	8.9
Sinclair Oil Corp.	70.5	63.6	66.0	66.0	66.0	66.0	66.0
Socony-Vacuum Oil Co.	96.9	80.9	80.0	80.0	80.0	80.0	80.0
Southwestern Oil & Refining Co.	3.7	7.3	7.5	6.8	6.8	7.5	6.8
Standard Oil Co. of California	66.7	70.8	80.1	80.1	80.1	80.1	80.1
Standard Oil Co. (Ind.)	15.4	16.1	13.3	12.6	6.6	14.6	13.1
Standard Oil Co. (N. J.)†	75.0	85.0	79.0	79.0	79.0	79.0	79.0
Sun Oil Co.	8.1	7.3	22.8	7.3	7.2	16.1	7.2
The Texas Co.	53.6	37.0	57.9	53.1	60.7	57.0	52.2
Tide Water Associated Oil Co.	8.7	16.4	12.3	12.9	6.8	8.6	10.8
Total East Coast	612.6	601.6	653.7	630.5	644.3	653.4	637.6
CRUDE—WEST COAST:							
Socony-Vacuum Oil Co.		7.6	17.0	17.0	22.0	27.0	28.0
Standard Oil Co. of California	9.3	24.2	15.6	15.6	15.6	15.6	15.6
The Texas Co.	11.3	9.8	10.3	9.9	11.3	10.0	10.0
Tide Water Associated Oil Co.	22.8	12.9	5.8	19.3	20.4	20.4	20.4
Total West Coast	43.4	54.5	48.7	61.8	69.3	73.0	74.0
Total crude	656.0	656.1	702.4	692.3	713.6	726.4	711.6
PRODUCTS:							
Asiatic Petroleum Co.	7.1	5.2	3.7	4.0	8.0	5.0	7.0
Eastern States Petroleum Co.	8.2	13.0	16.0	16.0	16.0	16.0	16.0
Gulf Oil Corp.	8.0	3.0	2.0	4.0	4.0	4.0	4.0
Shell Caribbean Petroleum Co.‡	93.0	117.0	135.0	165.0	175.0	165.0	125.0
Shell Oil Co.	17.1	11.5	26.9	18.0	19.0	21.0	22.4
Sinclair Oil Corp.	1.6						
Socony-Vacuum Oil Co.	6.7	9.7	8.3	8.3	8.3	8.3	8.3
Standard Oil Co. (Ind.)§	10.1	9.8	22.0	26.0	25.8	25.0	19.4
Standard Oil Co. (N. J.)†	96.0	159.0	184.0	184.0	204.0	204.0	204.0
The Texas Co.			3.5		8.4	6.0	9.4
Total products	247.8	328.2	401.4	425.3	468.5	454.3	415.5
Total crude and products	903.8	984.3	1,103.8	1,117.6	1,182.1	1,180.7	1,127.1
Bonded fuel included¶	76.0	66.9	70.3	69.5	70.5	67.9	69.5

*From company reports to the Texas Railroad Commission. †Based on quarterly estimates. ‡Imported by independent distributors. §Received through suppliers who furnish either domestic or foreign oil. ¶Mostly duty free for bunkering ships in foreign trade.

CRUDE AND PRODUCT IMPORTS*
(Thousands of barrels daily)

	1953 (actual)	1954 (forecast)	Per cent change
October	905.7	†984.3	8.68
November	1,019.5	1,103.8	8.27
December	1,045.4	1,117.6	6.91
Fourth quarter	989.9	1,068.2	7.91

	1954 (actual)	1955 (forecast)	Per cent change
January	1,051.3	1,182.1	12.44
February	1,091.7	1,180.7	8.15
March	989.3	1,127.1	13.93
First quarter	1,042.5	1,159.6	11.23

*From company reports. †Actual.

with a gain of 4.9 per cent forecast for product imports.

Actual company imports for October plus estimates for November and December combine to give fourth quarter increases over last year of 11.8 per cent for crude and 1.6 per cent for products.

Pipeline Movement Down

WASHINGTON.—A sharp drop in pipeline movement of crude and products in the third quarter was noted last week by the Interstate Commerce Commission.

Compared with the second quarter, the volume of traffic was down more than 21,000,000 bbl. and transportation revenues were down some $470,000. Compared with the third quarter of last year, the reports of 62 reporting pipeline companies showed the volume was down more than 21,500,000 bbl. but revenue was up nearly $490,000.

Total traffic during the 3 months ending October 1 was 890,961,075 bbl., compared with 912,341,078 bbl. in the second quarter. Revenues were $139,873,603 compared with $140,351,507 in the preceding quarter. Declines in traffic were shown by 38 of the 61 lines which reported for both the second and third quarters. Cherokee Pipe Line filed its first report at the end of the third quarter.

Texas Wildcat Hits Gas

SPEARMAN, Tex.—Humble Oil & Refining Co. has one of the Texas Panhandle's first Mississippian discoveries at its 1 Oil Development Co. of Texas, 5 miles north of here.

The well, in Section 2, Block 4-T, T&NO Survey, had calculated open flow of 1,500 M.c.f. of gas per day from Mississippian-Chester perforations at 7,650-76 ft. The flow followed acid and fracture treatment.

The discovery is located in Hansford County, Hugoton embayment's hottest area. It is 3 miles northeast of fast-growing Gruver-Penn field, and 4½ miles northwest of The Texas Co. 1 Blakemore, a Morrow gas well which reportedly found Mississippian gas on tests.

Mississippian oil previously was found in Lips Ranch field of nearby Roberts County in 1949. However, the discovery was later plugged back and completed in the Atoka.

Seismic Data Sound

. . . it's the geophysicist's interpretation that needs improving, Paul Lyons tells Dallas meeting of S.E.G.

Norman Morrisey

DALLAS. — There's nothing wrong with the geophysicist's tools, but he's not making the best use of them and because he isn't, the oil industry is using his services less and less.

Use of the seismograph has dropped to about 590 parties in the United States from the October 1952 peak of 710 parties, Paul L. Lyons told his colleagues at the eighth annual midwestern meeting of the Society of Exploration Geophysicists here last week.

While Lyons, president of S.E.G., didn't say in so many words that geophysics is in trouble, he warned that the industry is going to have to "improve its product, which is primarily the seismograph anomaly."

"The geophysical industry should examine the data it is securing to find why only one in six geophysical wildcats produce . . . this figure should be higher."

Lyons told the geophysicists they are failing to find the small seismic anomaly of 25 to 75 ft. of closure. He conceded small anomalies are harder to find than the large structures and blamed the use of "outmoded interpretation techniques, which found the big ones" for failure to locate smaller structures.

"We must modernize our interpretation to keep pace with instrumentation," Lyons warned, ". . . accuracy failures are not so much instrumental as interpretational."

Lyons pointed out that less than 10 per cent of the seismograph bill is for interpretation. He reminded his listeners that while the reduction in demand for geophysical services is based on economic factors over which the geophysicist has no control, "we can still alter the demand . . . by making its use even more desirable."

To combat the drop, Lyons suggested:

. . . **Methods to nullify** the adverse effects of topography on seismic data.

. . . **Calculation to avoid** the use of "that rubber yardstick," the velocity overlay.

. . . **More observational geology** and less triple integral mathematical assumptions in geophysical interpretations.

Improvement . . . Concentration on solving the minor problems in oil exploration may blind us to more fruitful areas of the unknown, Dr. James Boyd, keynote speaker at the meeting, said. Boyd, Kennecott Copper Corp. exploration manager, pointed out that no new exploration tools have been developed recently and commented that the industry continues to base its efforts on the "time-tried geological and geophysical methods."

Reflection seismograph methods must be constantly improved, he added.

"The place of geophysics in an expanding economy is intimately related to the development of knowledge derived from fundamental research," Boyd concluded. "The time has come for the practical geophysicist to recognize that future progress . . . will depend upon our ability to think in scientific terms."

Sale Price Is Record

VIRDEN, Man.—Canadian Gulf Oil Co. has offered a record-shattering bid of $312.50 an acre for two half-sections of federal land in the Virden-Roselea field.

Canadian Gulf's $200,000 tender was made for the east half of Section 34 and the west half of Section 35, Township 10, Range 26 west. The tract was used as an airport during World War II. The east half of 34 offsets production to the west and south, but there has been no drilling on Section 35.

The price compares with the previous Manitoba record of $94 an acre paid earlier this year for semiproved land in the same field area.

Dividends Show Increase

WASHINGTON. — Cash dividend payments by oil companies reporting to the Commerce Department in the first 10 months of 1954 ran better than 3 per cent ahead of the same period last year.

Payments for the period totaled

$759,900,000 compared with $731,700,000 last year.

Dividends paid in October amounted to $4,500,000, a $400,000 drop from the $4,900,000 paid in October 1953.

Oil Tariff Urged

T.I.P.R.O. claims plan will not hurt U. S. allies

DALLAS.—A revolutionary proposal to put a tariff on oil imports without causing economic harm to American allies was endorsed last week by directors of the Texas Independent Producers and Royalty Owners Association.

While reaffirming its previous stand in favor of an equalization tariff on imported oil, the group proposed a new use for revenue from such tariffs.

The directors suggested that the money collected under the oil tariff be credited to the country from which the oil was exported. This plan, they said, would offset the argument that our allies would suffer the cost of an equalization tariff. Instead, they concluded, it would increase the purchasing power of oil-exporting countries.

Under the T.I.P.R.O. proposal, the Tariff Commission would conduct a study to determine the cost differential between domestic and foreign oil. This differential would become the automatic tariff.

Gas controls . . . The association directors also voted to continue fighting federal regulation of gas producers and gatherers, but at the same time to press for state legislation "to correct price discrimination against gas producers and royalty owners."

The T.I.P.R.O. policy makers charged pipeline companies with "flagrant price discrimination" against producers. They accused the Federal Power Commission of trying to persuade producers and royalty owners to seek relief by assuring the agency's right to establish maximum well-head prices in the field. Any such FPC power, they said, would preclude the possibility of competitive natural-gas prices.

State legislation proposed by the association directors would require the Texas Railroad Commission to "take into account economic waste in the proration of natural-gas production to the end that price discrimination be eliminated and that the well-head price of gas may seek its free competitive level."

The group pledged itself to continue cooperation with all organizations, companies, and individuals in a drive to obtain legislative relief from federal control of gas production and gathering.

Industry Briefs

ODESSA, Tex.—An extra hazard has been added to the Odessa Country Club golf course. Herman Brown, Midland and Houston, last week moved a rig on location to start drilling at the 1 Odessa Country Club, a recently staked Ellenburger test in Headlee field, eastern Ector County.

LOS ANGELES.—The fourth annual instrument short course of the Southern California Meter Association will be held January 27-28 at the Los Angeles Harbor Junior College, Wilmington. An important feature of the short course will be an exhibit of instruments and automatic control systems.

RICHMOND, Calif.—California Research Corp., a subsidiary of Standard Oil Co. of California, has let construction contracts for more than $1,500,000 in new facilities at its laboratories here. The additions will be a new engine laboratory and a new wing on the laboratory-administration building.

NEW YORK.—Humble Oil & Refining Co. shareholders regard the stock of the parent company, Standard Oil Co. (N.J.), as a good thing. Jersey Standard last week said it has already received more than 2,765,616 offers to trade 10 Humble shares for 9 of Jersey. Jersey Standard made the offer late in October, but it was contingent on the parent company acquiring 2,765,616 shares of Humble. All Humble shares offered before November 30 will be exchanged under terms of the offer.

MIDLAND, Tex.—Joseph V. Dunbar, recently elected president of the American Association of Oilwell Drilling Contractors, last week presented certificates to 33 graduates of the 6-week course in drilling technology just completed at Odessa College. The graduates included 17 drilling superintendents and tool pushers, five engineers, five drilling-company general managers, three drillers, and three "miscellaneous." The school was sponsored by the association, the Petroleum Extension Service of the University of Texas, and the production division of the American Petroleum Institute.

AUSTIN.—The Texas Board of Water Engineers has approved an application of Pure Oil Co. to increase its take of water by 929 acre-feet yearly from the branch of the Neches River for its oil operations in Van Zandt field, Van Zandt County. Pure told the board that its existing appropriation from the stream of 670 acre-feet a year had proved inadequate.

WASHINGTON.—Standard Oil Co. of Texas has been granted accelerated amortization on its 248-mile products line between El Paso and Albuquerque. The line is now under construction. The Office of Defense Mobilization granted a fast writeoff on 40 per cent of $506,500 for storage and 25 per cent of the $3,643,500 line-construction cost. Houston Contracting Co. is contractor on the $4,000,000 project. Actual construction of the line began late last month.

TULSA.—Sunray Oil Corp. has moved into its new office building here. The 13-story building houses practically all of Sunray's more than 500 Tulsa employes.

AUSTIN.—Texas' tax take from gross production levies on crude and natural gas came to $11,726,980 last month — down about $176,000 from September. A sharp $400,000 drop in tax collections on crude production was partly counteracted by a $225,000 gain from the gas levy due to the normal seasonal upturn in gas production.

AUSTIN.—Applications to drill, which are a good barometer of current drilling conditions, climbed to 108 last week in Texas Railroad Commission Districts 8 (West Texas) and 7-C (West Central). This is the second week in 2 months that applications have exceeded the 100 mark in these areas. The figure is high in comparison with weekly applications filed during concentrated drilling periods of recent years.

HOUSTON. — Station Construction Co., Houston, will start work soon on a $1,500,000 compressor station for Trunkline Gas Co. 15 miles north of Edna, Tex. The plant will be a 6,350-hp. booster unit of the gas-turbine type, and will be the second such plant in the state.

COLORADO SPRINGS.—Colorado Interstate Gas Co. has completed a 230-mile microwave radio relay system connecting headquarters here with pipeline compressor stations and gas-producing fields in Kansas and Oklahoma. The system provides regular voice-telephone communications channels and circuits for remote control operations.

PIERRE, S. D.—An auction will be held here November 29-30 for oil and gas leases on 125,296 acres of state land in five South Dakota counties. The counties and acreages involved are: Fall River, 2,826; Haakon, 44,744; Jackson, 1,800; Jones, 39,914; and Stanley, 36,012.

EQUIPMENT YARDS and supply companies are on the spot for these wells along Cherry Avenue, Long Beach's "Supply Row." This pair of neighborly wells are being drilled by Paulin Oil Co. (foreground) and Termo Oil Co.

Long Beach Airport is . . .

. . . Rival for Signal Hill

D. H. Stormont

LONG BEACH.—A deep discovery in the shadow of Signal Hill is yielding wells which rival the prolific producers of the 25-year-old neighboring field.

Most of the seven wells so far completed are probably capable of flowing several thousand barrels of oil daily, but their output is being limited to several hundred barrels with ¼-in. chokes. Total production is estimated at 4,500 bbl. daily.

The new find promises to emulate its famous neighbor in still another way—very close well spacing. Portions of it may be developed at one well per acre.

The Texas Co., discoverer of the 8,000-ft. pool, holds a 1,040-acre lease on the Long Beach airport and adjacent city lands. Bulk of its lease lies east of the discovery area, however. North and west, across Cherry Avenue—"Supply Row" for the Los Angeles Basin—lie numerous small leases.

All ingredients for a highly competitive situation are present: numerous small leases . . . several operators . . . and a pay section 1,400 ft. thick in some wells.

Drilling . . . The discovery well, completed last February, failed to reveal the pool's true potentialities (and Texaco had paid a bonus of $100 per acre and a royalty of about 42 per cent). Drilled to 13,016 ft., 1 Long Beach Airport-1 flowed 150 bbl. of 32°-gravity crude through a ¼-in. choke. Production was from 315 ft. of perforations at 8,750-9,065 ft. in a Miocene sand.

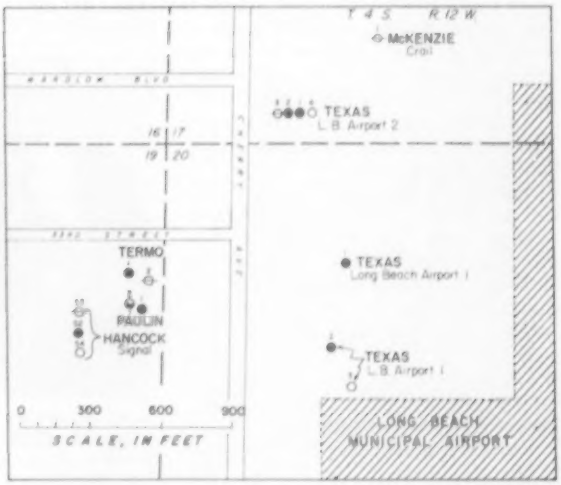
The second, 1 Airport-2, flowed 350 bbl. daily through a ¼-in. choke when it was completed in June at a plugged back depth of 8,307 ft. The third completion, the well which started offsetting operators drilling, was Texaco 2 Airport-1. When completed late in September, it flowed 637 bbl. of crude daily through a 17/64-in. choke. Well data released indicated some 1,400 ft. of pay.

During October three other producers were added, all with initial productions of 600 bbl. daily through ¼-in. chokes. These were the wells of Paulin Oil Co., Termo Oil Co., and Texaco 2 Airport-2 (see map).

Most recent completion was Hancock Oil Co. 52 Signal. With perforations set at 7,240-8,640 ft., the well flowed at a 3,000 bbl. daily rate while cleaning out. It flowed 1,922 bbl. net daily through a 36/64-in. choke.

The Conservation Committee of Cali-

NEW PLAY in the shadow of the old Signal Hill field has already given California seven new wells capable of producing several thousand barrels daily. After The Texas Co. added 2 Long Beach Airport 1 to its discovery well in 8,000-ft. pool, offset operators started drilling west of Cherry Avenue, Long Beach's "Supply Row."



fornia in its discovery memorandum classified the discovery as the Airport area of the Long Beach field, but pointed out it was generally agreed there is a fault somewhere in the ½-mile intervening area. The committee has assigned an M.E.R. of 350 bbl. daily to the new producers.

Spacing . . . Division of Oil & Gas, the state agency which enforces well-spacing statutes, says the discovery is a separate accumulation; not an extension of the old Signal Hill field. Under this ruling development cannot exceed one well per acre, with wells at least 75 ft. from lease boundaries.

Accordingly, when Paulin Oil Co. tried to drill a second well on its I.C.I. lease, the agency halted drilling as there were not the necessary two acres to permit a second well. In early November the well was still idle.

In contrast to The Texas Co.'s extensive lease, the holdings being developed by other operators are all small. Hancock Oil Co. Signal lease contains approximately 15 acres; that of Termo Oil Co. is about 5 acres. Most of the area around the discovery is devoted to oil industry supply and service firms.

In addition to the four drilling wells shown on the accompanying map, The Texas Co. is moving in a second rig to start work on 3 Airport-1. Other wells are planned on nearby small tracts. Another deep test resulting from the discovery is Oceanic Oil Co. 1 Brown-Updike. It is slated to start near the Pacific Coast Highway traffic circle in 33-4s-1w, about 2½ miles southeast of the airport activity.

What Discoveries Cost

West Coast operators told it took an average of $840,000 to find each of 11 new pools in coastal area during 1954

LOS ANGELES.—Each of the 11 oil discoveries made in the coastal area of California this year has cost operators an average of about $840,000.

In all, wildcatters have spent an estimated $9,252,000 searching for new oil reserves in this area during the current year.

These estimates were presented by J. F. Curran, Honolulu Oil Corp., Santa Barbara, in an address before the Pacific Section, American Association of Petroleum Geologists. Meeting jointly with the A.A.P.G. group were the Pacific sections of the Society of Exploration Geophysicists and the Society of Economic Paleontologists and Mineralogists.

During the year, Curran said, 110 exploratory wells have been drilled in this region for an aggregate depth of 616,816 ft. They resulted in the discovery of one new field and 10 new pools.

In estimating the cost of wildcatting operations, Curran assumed an average cost per foot of $15.

Despite the large cost per well, most of the wildcat wells were relatively shallow, with 43.6 per cent of them being less than 5,000 ft. in depth and 40.9 per cent being between 5,000 and 10,000 ft. Four of the area's discoveries, Curran said, were between 2,000 and 3,000 ft. deep, three were between 9,000 to 10,00 ft., two were between 10,000 and 11,000 ft., and two were between 13,500 and 14,500 ft.

Not a single discovery has been made in the area during 1954 at depths between 3,000 and 9,000 ft., Curran noted.

"Hot spot" of the entire coastal area has been Oxnard, he said. There increased activity has resulted in discovery of at least three deep pools.

Offshore reserves . . . Frank Hortig, State Lands Division, estimated California's offshore oil reserves at 4 billion barrels.

Past production of these lands was placed at 248,000,000 bbl., which yielded the state $85,000,000 in royalties. Offshore production during the first half of this year accounted for 7,529,000 bbl. of oil.

R. F. Dill, Geological Diving Consultants, San Diego, reported that more than 1,500 dives have been made to obtain geological data in the offshore area. Some of the deep-sea diving has been to depths of 150 ft., he said.

Oil frontiers . . . Some of the most challenging oil frontiers today are in California, according to Leo R. Newfarmer, Shell Oil Co. He said geologists tend to obscure many exploration frontiers by covering them "with a thin web of information."

"Even in the Los Angeles Basin, and certainly in practically every other sedimentary basin of California, there are many portions of the earth's crust which are less than 10 per cent explored . . . .

"In California, the utmost in structural deformation often is combined with thick oil zones so rich that a 50,000,000-bbl. field may be in a trap smaller in size than one section of land."

New officers . . . Frank S. Parker, Signal Oil & Gas Co., was elected president of the A.A.P.G. section for 1955. Other newly elected officers are Ben C. Lupton, General Petroleum Corp., vice president; R. B. Kelly, Continental Oil Co., secretary; and L. J. Simon, The Texas Co., treasurer. All are of Los Angeles.

New officers of the S.E.G. section are J. W. Mathews, Richfield Oil Corp., Bakersfield, president; R. W. Shoemaker, Ohio Oil Co., Bakersfield, northern vice president; and E. M. Curry, Shell Oil Co., Los Angeles, southern vice president.

H. G. Billman, Union Oil Co., Bakersfield, was elected to head the S.E.P.M. group, and E. H. Stinemeyer, Shell Oil Co., Bakersfield, will serve as secretary-treasurer.

NEW OFFICERS elected by the Pacific Section, American Association of Petroleum Geologists, for 1955 are (left to right) president, Frank S. Parker, Signal Oil & Gas Co.; vice president, Ben C. Lupton, General Petroleum Corp.; secretary, R. B. Kelly, Continental Oil Co.; and treasurer, L. J. Simon, The Texas Co. All are of Los Angeles.

Use of dynamite will cut . . .

. . . Offshore Seismic Budget

LOS ANGELES.—An explosive which gives better records and costs only a tenth as much as black powder promises to eliminate powder in offshore seismic work off California.

The new offshore explosive is dynamite, arranged in small charges and fired progressively so that the pressure waves generated have wave fronts that are less steep than a concentrated charge.

It is called "Multipulse" and was described before the Pacific Coast section of the Society of Exploration Geophysicists here last week by J. J. Jakosky of International Geophysics, Inc., which has been carrying out studies with the material since early this year.

Nine or ten-pound charges of Multipulse gave greater depth penetration and generally better quality records than 90-lb. shots of black powder, the speaker declared. Most of the former is about $3 while that of black powder is around $25.

For the past 3 years only black powder could be used in offshore exploratory work. Previously, in 1949, all work had been halted because the dynamite charges used were killing large quantities of fish.

Black powder has a very low fish kill but its record quality often is of lower grade than that obtained from dynamite. Its use also has thrown a very heavy financial burden on offshore exploration. About 90 lb. is required to give reflections comparable to those obtained by use of 5 or 10 lb. of dynamite.

How it works . . . Dividing dynamite into small pellets was found to be the best method for slowing down the velocity of the dynamite explosion.

The first pellet at one end of the string is fired. The wave from this pellet then travels through the water to the next pellet in line and fires it. Continuation of this process results in a series of small explosions or pulses, each spaced a few microseconds apart and extending over the desired time interval.

In the experimental work, Dr. Jakosky brought out, study of the pressure curves obtained showed the presence of an abnormally high, short-duration initial peak pressure at the start of the wave. This was found to be due to the use of a No. 8 blasting cap, which initiated a high-velocity wave through the first one or two pellets.

Use of a special low-strength blasting cap and further subdivision of the pellets eliminated this difficulty. Further work with the explosive produced excellent seismic records, with negligible fish kill. Over-all velocity of this material was about 4,000 ft. per second, and like black powder, is below the acoustic velocity of sound in water.

Deepest Producer Idle

BAKERSFIELD. — Distinction for having the world's deepest oil producer has shifted from California to Louisiana.

The previous record holder, Richfield Oil Corp. 67-29 C.L.-A in the North Coles Levee field, is now idle. Completed last December in Eocene sand at 17,500-17,892 ft., the well originally produced high-gravity crude at the rate of 119 bbl. daily, but production dropped rapidly to about 15 bbl. per day. Richfield will attempt to reperforate farther up the hole.

Succeeding the California well as the world's deepest current producer is Shell Oil Co. 2 Gonsoulin Minvielle-State Unit in Weeks Island field, Iberia Parish, Louisiana. Production is from 17,260 to 17,306 ft.

Rocky Mountain

Rockies Step Up Pace

Colorado, Utah, Montana add successful wildcats

DENVER.—Rocky Mountain oil operators continue to turn out an impressive list of significant discoveries.

Seven indicated wildcat successes were reported in the Rocky Mountain states last week. Colorado and Utah led with three each, and Montana had one.

Colorado . . . Ryan Oil Co. and Davis Oil Co. cored 13 ft. in permeable, porous Dakota D sand with good saturation at their 1-A Good in Logan County.

Strain Drilling Co. 1 Kaepernik, also in Logan County, got gas at the rate of 6,000 M.c.f. per day.

In Washington County, one of the most active wildcat areas in the state, Vaughey & Vaughey 1 Downing recovered 1,200 ft. of oil on drill-stem test of Cretaceous sands. This wildcat is 1½ miles southeast of Little Beaver field.

Montana . . . Powder River County in Montana has its first indicated discovery at a slim hole being drilled by George J. Greer, trustee. The well blew out at 3,160 ft. Gas flow was estimated at 2,000 M.c.f. per day, with some distillate. The pay zone is believed to be Eagle (Cretaceous).

Nearest full-hole wells are several miles away. The Powder River basin area around Broadus, Mont., has had little drilling.

Utah . . . This state enjoyed one of its best wildcat weeks in months. The Uinta basin has two new possible hits, while the relatively dry Paradox basin has one of its most significant developments in recent years.

Carter Oil Co. 2 Unit, Bluebell Unit, Duchesne County, recovered 2,790 ft. of oil and 450 ft. of oil-cut fluid on drill-stem tests. This Uinta basin wildcat is 8 miles northwest of Roosevelt field.

Chapita Wells field in Uintah County has a new pay at Continental Oil Co.'s 2 Unit. The discovery recovered gas at the rate of 4,000 M.c.f. per day on test of the Wasatch (Tertiary) at 5,060-5,115 ft.

In the Paradox basin of southeastern Utah, Shell Oil Co. 2 Desert Creek in San Juan County flowed at the rate of 1,150 bbl. of oil per day on choke in a 3-hour test of the upper Paradox. The wildcat is just north of the Arizona border and Boundary Butte field. Shell has shut in the discovery for storage. *(See page 147).*

Joint Exploration Planned

SALT LAKE CITY.—English Oil Co. and Panhandle Oil Corp. have entered a 5-year agreement for joint operation and exploration in Colorado, Wyoming, Utah, and Montana.

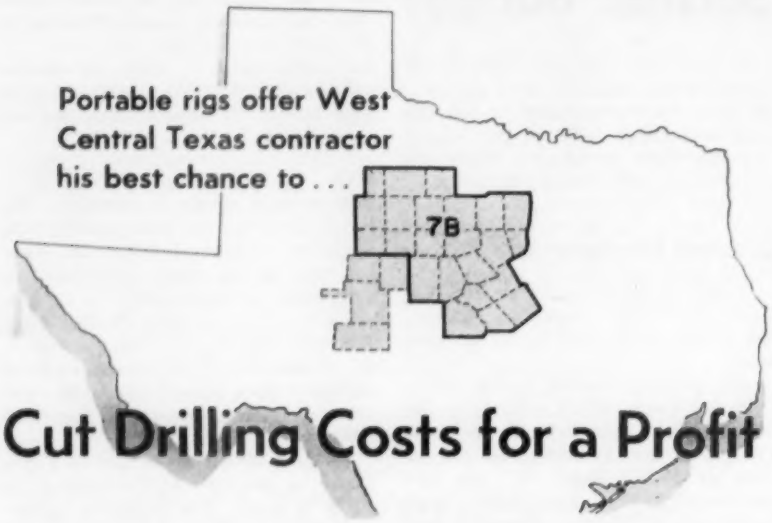
Exploration will be conducted on approximately 300,000 acres of undeveloped leases and 50,000 acres in which the companies have a net override interest. Panhandle will acquire an undivided one-half interest in these holdings from English Oil.

Oil Basin Line Completed

BILLINGS, Mont.—Oil Basin Pipeline Co. has begun moving products through its recently completed $5,350,000, 230-mile, 8-in. line from Laurel to Glendive, Mont.

The line, which runs through Billings, was built by Midwestern Constructors, Inc., of Tulsa, in approximately 4 months. William H. Tegtmeyer, of Chicago, is president of Oil Basin.

Carter Oil Co., which has a 25,000-bbl. refinery at Billings, and Farmers Union Central Exchange, which has a 15,000-bbl. plant at Laurel, have agreed to use the line.



Cut Drilling Costs for a Profit

Robert J. Enright

ABILENE, Tex.—The next few years will see drilling contractors in West Central Texas turning more and more to portable rigs.

West Central Texas is generally known to the oil man as the Texas Railroad Commission's District 7-B plus Runnels, Coke, Tom Green and Schleicher counties to the southwest. Contractors in this fiercely-competitive, 28-county drilling area are turning to portable rigs because the move-in, rig-up, tear-down operation is about the only place they can cut costs.

The swing to portable rigs won't materialize overnight. It will be a gradual trend. It **would** happen overnight, if most of the contractors in the area could see their way clear.

The average contractor has a heavy investment in his present equipment which he is having a tough time recovering at present depressed footage rates, even though drilling activity is at an all-time high. This naturally makes him reluctant to take on an added financial burden for new equipment.

Prices which the contractor must pay for everything he uses—rigs, drill pipe, drilling mud, labor, etc.—have spiraled steadily since World War II, and footage rates have lagged far behind. Footage rates haven't kept pace because of intense competition for contracts which began, most contractors say, with the exodus of hundreds of rigs from the Spraberry area when the boom there fizzled out.

Transportation costs to the contractor, always a considerable part of his total expenses, have shot upward probably faster than his other costs.

One big factor in this increased moving expense is the Texas Railroad Commission ton-mile moving rate if the move is through two or more incorporated towns. It is generally agreed that this has run up moving costs about one-third over the truck-hour rate formerly in use.

A boost in moving costs hurts more in this area than in some others because the relatively shallow depth of pay formations requires more moves to drill the same amount of hole. One average-sized contractor placed his trucking bill last year at $100,000.

"If I could cut this just 25 per cent," he said, "I'd be jumping my profit $25,000 and that's enough for a man to live on comfortably for a year . . . including me."

The best apparent answer to this problem is to operate a rig with its own wheels.

B. F. (Bob) Gilchrist, president of Gilchrist Drilling Co., Abilene, goes along with this. Gilchrist Drilling owns and operates five various-sized rigs enabling the firm to drill from "the grass roots to 15,000 ft." Gilchrist estimates that he could make just as much money as he is now with three portable rigs.

Faster Drilling . . . West Central Texas contractors, like their counterparts throughout the country, have been trying hard to counteract rising costs and declining footage rates by drilling wells faster.

To this end, they have resorted to bigger pumps, jet subs, and in some cases bigger drill collars. Gilchrist Drilling buys a new and larger pump every time it wears one out. The company has not as yet resorted to larger drill collars but has been studying such a move and may employ them soon.

Jet subs are frequently used to speed drilling of the upper part of the hole. Most contractors agree that this is where the profit is, if there is a profit. The faster the contractor drills the first few thousand feet of hole, the more money he makes. He considers himself lucky to break even on the last 3,000 ft. of a 6,000-ft. hole, and this includes day work.

Such measures taken to speed penetration, however, also are expensive. And present slim profits make it hard for the contractor to buy the needed equipment. This is especially so in the case of the small contractor who predominates in this area. A set of heavy drill collars, as one contractor puts it, may cost from $60,000 to $70,000, and "I can buy another small rig for that price."

Another condition plaguing contractors in the area is traditionally low day-work rates. Some contractors have been notably reluctant to undertake re-entry projects, which are performed entirely on a day-work basis. This local condition has proved a bit hard to explain to the operators.

Contract practices . . . The downward trend in footage rates has resulted in more and more contracts on a bid basis. This in turn has required that the contractor know exactly where he stands on his costs and his rate of penetration.

In spite of this trend, however, operators in some cases are still paying a premium to acquire the services of a contractor who is a known and proved quantity.

Numerous troublesome lost-circulation zones in the western portion of West Central Texas have made it common practice to insert a protective clause in drilling contracts to guard against prolonged work stoppages due to loss of circulation. The conventional lost-circulation clause provides that the contractor goes on a day-work basis after a specified number of hours of lost circulation.

The lost-circulation threat has led to the virtual extinction of so-called "turnkey" contracting, where the contractor agrees to drill a well for a set sum.

Equipment replacement . . . Most contractors are in general agreement that roughly 20 per cent of earnings should be set aside for maintenance and replacement of equipment. All agree that with present depressed profits this is

extremely hard to do, if not impossible.

The necessity of setting aside a large part of income for equipment replacement has resulted in a rude awakening for many a new contractor.

The story goes something like this:

A man buys his first rig, gets some contracts, makes a profit on the first few holes, and everything is rosy. His first inkling of the high rate of depreciation of drilling equipment may come 18 to 24 months later when he suddenly discovers he has to buy a new string of drill pipe. He's forced to go to the bank for a loan and then must rake up $3,000 a month or so to pay it off. It is only then that he finds he's not really making so much money.

In spite of the present rough going in the drilling business, however, most West Central Texas contractors are optimistic. Concensus seems to be that the contracting business has always been plagued with ups and downs, that most contractors, especially the experienced ones, will survive the present doldrums, and that better times are ahead.

Emphasis on Floods

Success of projects plus general decline of North Texas fields increase operators' interest in water flooding

Edwin McGhee

WICHITA FALLS, Tex.—Successful water floods in three North Texas fields show that operators can look forward to even further emphasis on secondary recovery in this area.

One of the most rewarding floods ever reported in this area is Magnolia Petroleum Co.'s. operation in West Burkburnett field. J. W. W. Whitney, Jr., of Magnolia, Electra, Tex., told a secondary recovery symposium here his company's production from its West Burkburnett field leases was only 250 bbl. per day in 1942 when it started water injection. That figure jumped to more than 7,000 bbl. per day in August 1953; and production is still in excess of 5,000 bbl. daily.

A combination gas-injection and water-flood in the Hildreth field has also met with satisfactory production increases, as cited by R. L. Freeborn of Continental Oil Co., Wichita Falls. A third field in North Texas, the giant K.M.A. field, is the scene of several pilot-flooding operations, the majority of which are successful according to R. P. Dobyns of the Bureau of Mines, Wichita Falls.

More than 1,000 registered for the meeting, which is sponsored jointly by the North Texas Oil and Gas Association and the North Texas Section of the A.I.M.E. Attendance, greatly increased over previous yearly meetings, attests to an accelerated interest in secondary recovery by operators of this area. A growing number of North Texas fields are reaching the stripper stage, and this helps promote the trend to flooding.

Other side of the picture . . . You always hear about the successful water floods, but never about the failures; so proceed with caution. This, in effect, is the advice to the group from L. L. Brundred of Brundred Enterprises, Abilene. Approximately 7 out of 10 water flood attempts are failures, according to Brundred. Most of these failures can be attributed to improper engineering, lack of experience, or shortage of working capital. While water flooding is often considered the safest of oil ventures, Brundred conceded, the "first results" from it are often long delayed and payout slow.

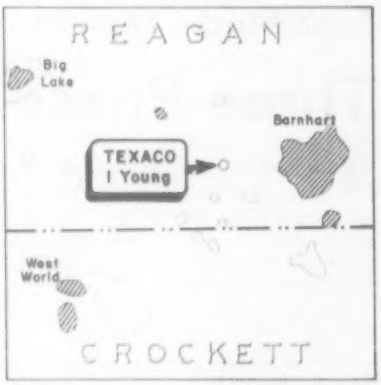
Fracturing controversy still alive . . . No one at this secondary recovery symposium seemed certain when hydraulic fracturing is absolutely disasterous to a flood and when it might be only mildly objectionable. One side of the picture was presented by G. L. Buckles of Monahans.

Buckles said all evidence indicated that fracturing in a Yates sand well in West Texas permitted bypassing of large quantities of oil and early abandonment of a nearby producer.

W. L. Horner of Core Laboratories, Inc., Dallas, agreed that fracturing is influential to some extent in flooding considerations, but said that it is not of controlling importance. Horner cited the success of flooding operations in the Langston-Kleiner field of Young County, where fracturing has been practiced extensively in both injection and producing wells. No detrimental effects on sweep efficiencies are evident, and the injectivity has probably benefited from fracturing. Horner suggested that the question must be decided by engineering studies of each individual field.

Saved by surfactants . . . A field trial has proved the worth of a new and highly effective treatment for the control of swelling of bentonitic clays in water-flooded reservoirs. P. D. Torrey of the Orchem Corp., Austin, presented water injection figures of the Queen sand water flood in the Weiner-Colby field of Winkler County, to show how surface active agents have prevented this operation from coming to an early "stagnant condition." The new method consists of placing hydrochloric acid in the formation near the well bore in order to contract the clay minerals to minimum size. Then, nonionic and cationic surface-active agents are injected in solution with flood water. The clay particles become "waterproofed," and a high degree of permeability to water is maintained in that area.

In the Weiner-Colby field, the rate of water input and of oil production has almost quadrupled since chemical treatment was initiated.



Texaco Shifts Sights

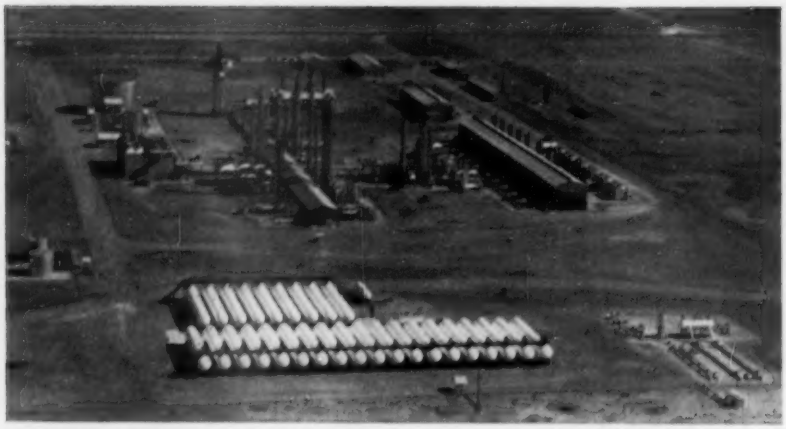
Ellenburger test completed as discovery in Fusselman

BIG LAKE.—The West Texas exploration spotlight last week turned to the southern end of the Midland basin where The Texas Co. 1 Young, originally planned as an Ellenburger wildcat, stopped short of that formation and was completed as a 1,669-bbl. Fusselman discovery.

The final gage was based on a flow of 347.7 bbl. of 44° oil in 5 hours through 28/64-in. choke. Gas-oil ratio was 243:1 and flowing pressure was 800 psi. Pay section, tentatively identified as Fusselman, (Silurian), is open hole at 9,239-9,346 ft.

The discovery, 3 miles southeast of here, is in an area that has had little exploration this year. It is 4 miles west of Ellenburger production in Barnhart field. The shaded areas on the accompanying map indicate pre-Permian production.

The quick completion of the Texaco well came as a surprise to West Texas operators who have been watching the Midland-Ector discoveries.



PEGASUS GASOLINE PLANT will supply residue gas and compressor capacity for high-pressure gas-injection pilot in the southwest portion of the field.

First Step Taken in . . .

Three-Phase Pegasus Plan

MIDLAND, Tex.—The first of three pilot projects which are expected to balloon into one of the country's biggest pressure-maintenance operations has been kicked off 20 miles south of here in Pegasus field.

The big project may result in two records:

. . . **The highest gas-injection** pressure ever reached.

. . . **The deepest water flood** ever attempted.

Figures have not been released on ultimate recovery from the project, but it is expected to rank only behind those in Kelly-Snyder and East Texas fields in regard to volume of additional oil resulting from pressure maintenance.

Magnolia Petroleum Co., operator of the approximate 17,850-acre Pegasus Unit straddling the Midland-Upton county boundary, is injecting about 5,000,000 cu. ft. of gas daily through a pilot input well in the southwest portion of the field.

The pilot is classed as a high-pressure project, with the gas currently being injected into the 10,300-ft. Pennsylvanian formation at a pressure of 3,500 psi. Injection volume may be increased to about 10,000,000 cu. ft. daily and pressure to about 4,500 or 4,600 psi. Such a pressure would be higher than any ever before attempted—with the present mark of about 4,000 psi. held by Atlantic Refining Co. in its Block 31 Devonian project in Crane County, West Texas.

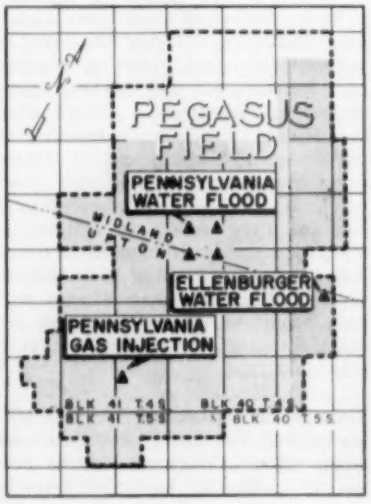
Gas for injection is residue supplied by the Pegasus Unit gasoline plant, which also is furnishing 4,700 psi. in compressor capacity for the pilot.

What is planned . . . Injection of gas into the Pennsylvanian is only one phase of the three-pronged operation to test feasibility of a field-wide, two-reservoir pressure-maintenance program.

The unit will compare results of gas injection into the Pennsylvanian with those obtained from a five-spot pilot water flood in that pay. The Pennsylvanian flood will start shortly after the first of December in the center of the field. About 1,000 bbl. of water will be injected daily in each of four input wells.

Either gas or water injection in the Pennsylvanian, depending upon which pilot performs best, will later be extended throughout the field.

Probably not long after the first of the year, the deepest water flood ever attempted will be launched in the field's Ellenburger formation at 13,000 ft.



The pilot, employing only one input well in the extreme eastern part of the field, may be expanded to a field-wide peripheral injection program at a cost estimated at about $6,000,000. Water input at the start will average about 10,000 bbl. daily. This is considered sufficient to take care of 43 per cent of reservoir voidage.

A Magnolia spokesman said flooding at this depth presents no special problems—and even works to the advantage of the operator in some instances. A favorable factor is the added head on the injection water, which increases with the depth of the pay formation. The only drawback, he said, would be the higher cost of reworking wells.

The water treating and injection plant, which will handle the water for both pilot floods, has been completed by Olson Construction Co., Houston, at a cost of about $1,250,000.

One of the biggest . . . Though both the Pennsylvanian and Ellenburger pays in Pegasus are reasonably well-defined, neither has been completely developed.

Magnolia estimates there will eventually be roughly 365 producers in the field if proved acreage is completely drilled on the present 80-acre spacing pattern. Magnolia, which discovered the field, is by far the largest operator, controlling almost 80 per cent of the surface acreage.

Magnolia did not reveal how much additional oil it expects to be recovered from the operation. However, a company official said the company's share of total additional oil will be considerably greater than the 140,000,000 bbl. it expects to receive by virtue of its 14 per cent interest in the one billion barrels estimated recoverable in the mammoth SACROC project in Kelly-Snyder field of Scurry County.

Participants . . . There are 39 companies and individuals participating in the Pegasus Unit on an acre-feet-of-pay basis.

Twenty-two firms or individuals have production both in the Ellenburger and Pennsylvanian. Six have production only in the Ellenburger, 11 only in the Pennsylvanian. Magnolia's participation is about 80 per cent in the Ellenburger and about 70 per cent in the Pennsylvanian.

Since the unit was set up, an additional 1,600 acres has been taken in—one and a half sections on the northeastern end of the field, one section on the west.

Why unitization . . . The Ellenburger and Pennsylvanian pays in Pegasus were discovered in March 1949 and March 1951, respectively. Both are

asymmetrical anticlines with three crests, both produce under solution-gas drive, and both are plagued with rapidly declining bottom-hole pressures.

The 300-ft.-thick Ellenburger has produced roughly 14,000,000 bbl. while pressure was dropping about 2,000 psi. from an original figure of 5,668 psi. Bottom-hole pressure in the Pennsylvanian has declined about 1,500 psi. from the initial 4,567 psi. Cumulative production from this 70-ft.-thick pay formation is well over 3,200,000 bbl.

Magnolia calculates that reservoir pressures would continue to drop and gas-oil ratios to climb unless pressure maintenance is undertaken. The company placed ultimate primary recovery from the Ellenburger at 18 per cent, that from the Pennsylvanian at 15 per cent.

The company estimates that ultimate recovery with pressure maintenance will be boosted 50 to 100 per cent from the Ellenburger and from 50 to 150 per cent from the Pennsylvanian.

Parks flood near . . . Just a few miles to the north, Magnolia, as unit operator, is preparing to launch another sizable water flood in the Bend section of the Pennsylvanian in Parks field of Midland County.

Here, too, a pilot project will be conducted initially in the 10,400-ft. Bend pay on the eastern edge of the field before a full-scale flood is attempted. If the pilot proves a unit-wide operation feasible, it is estimated that an additional 7,500,000 to 22,500,000 bbl. of oil will be recovered over primary production.

The Parks unit takes in more than 8,400 acres on the east side of a north-south fault running through the 10,800-acre field. The field is defined but not completely developed, and it is thought that there ultimately will be more than 70 producing wells.

Magnolia is the largest operator in the field with a percentage participation of about 92.5 per cent. Participation is based on gross acre-feet of formation.

Texas Raises Allowable

Commission sets 16-day producing schedule after 4 months at 15-day pace; December's figure set at 2,961,782 bbl.

AUSTIN.—Texas operators will produce oil during December at the highest rate since July.

After 4 consecutive months of 15-day producing schedules, the Texas Railroad Commission last week hiked the pattern for next month to 16 days.

The action upped the December allowable to 2,961,782 bbl. daily—72,235 bbl. daily over that in effect November 6. It was the second straight monthly increase, raising the allowable 148,793 bbl. daily over what it was October 9.

The commission acted in line with the majority recommendation of the purchasing companies. Seven of these—Sinclair Oil & Gas Co., Magnolia Petroleum Co., Gulf Oil Corp., Humble Oil & Refining Co., Atlantic Refining Co., The Texas Co., and Continental Oil Co.—recommended 16 days. Shell Oil Co., Cities Service Oil Co., and Stanolind Oil Purchasing Co. asked that the 15-day schedule be retained. The only purchaser favoring more than 16 days was Sun Oil Co. at 17.

Stolen markets? . . . Commissioner Olin Culberson questioned at the state-wide hearing whether Texas may be placing too much emphasis on nominations.

He said statistics show that while Texas has been trying to hold production in line with demand, other states have been taking some of its market. The Texas allowable, he said, has declined 289,000 bbl. daily since the first of 1953, and if someone weren't buying that additional crude it wouldn't have been produced.

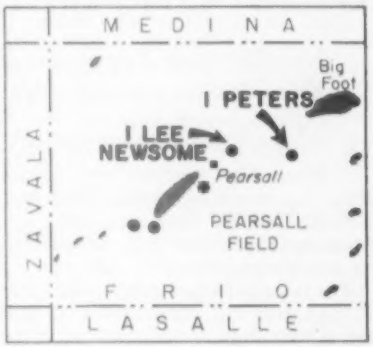
At the first of 1953, Culberson said, Texas was producing 44.76 per cent of United States crude. Other areas west of the Mississippi and east of California contributed 31.11 per cent. Now Texas is producing only 42.05 per cent of the total—down 2.71 per cent—while these other areas have increased their share 2.48 per cent.

Too much weight, he maintained, has been placed on nominations and not enough on economic effects on producers and royalty owners.

Culberson's statement was endorsed by H. P. Nichols, Tyler, Tex., independent, who urged the commission to "give the purchasers all they want and maybe a little more."

DECEMBER ALLOWABLE

District—	December	Increase from Nov. 6
1—Southwest	55,222	636
2—Gulf Coast	142,541	4,159
3—Gulf Coast	459,013	9,875
4—Southwest	252,065	6,041
5—East Central	46,468	866
6—Outside E. Texas	119,397	3,380
6—East Texas field	218,332	6,260
7-B—West Central	162,244	4,516
7-C—West Central	209,033	7,163
8—West Texas	928,823	23,845
9—North Texas	259,912	4,895
10—Panhandle	108,732	599
Total	2,961,782	72,235



Chalk Well Tested

Discovery is fifth Frio County chalk test of '54

PEARSALL, Tex.—A new Austin chalk producing area, the fifth discovered in Southwest Texas' Frio County this year, is being opened 2½ miles east of here by a well flowing, on prepotential tests, at the rate of more than 600 bbl. per day through 13/64-in. choke.

The discovery was made by Sutton Drilling Co. at its 1 Lee Newsome, in the Pedro Flores Morales Survey. Its fractured chalk pay is in open-hole section at 5,240-85 ft. Flow was under pressure of 700 psi. on the tubing.

The well is more than 4 miles northeast of nearest chalk producer in Frio County's 20-year-old Pearsall field. It is approximately 7 miles west of a new Austin chalk discovery, 1 Peters, being completed by Athens & Fitzgerald, also of San Antonio.

The 1 Peters is being put on the pump with its pay in open-hole section at 5,389-5,671 ft. A recovery of more than 1,300 ft. of clean oil was made in drill-stem taken with bottom of the hole at 5,492 ft. Additional fractured zones showing oil were logged in deepening the hole to its present total depth.

Others . . . Previous Austin chalk oil discoveries in Frio County this year included one, in October, by Alaska Steamship Co. 10 miles northwest of Dilley and south of production in Pearsall field; another, in August, by Drilling & Exploration Co., Inc., in the Melon area, 2½ miles south of Pearsall, and about the same distance southeast of production in the Pearsall field; and the other, in March, by James M. Anderson 11 miles southwest of Pearsall, and 2 miles southwest of the south end of Pearsall field.

Bids Unscrambled

Humble gets first federal lease on Continental Shelf; Kerr-McGee gets back $2,932,800 deposit on mistake bids

WASHINGTON.—Humble Oil & Refining Co. gets the first federal lease on the Continental Shelf and Kerr-McGee Oil Industries, Inc., gets back the $2,932,800 it deposited with its now famous mistaken bids.

The Interior Department has accepted as high bids the offers made by Gulf Oil & Refining Co. and Humble on the two tracts off Louisiana on which Kermac furnished unintentional competition.

Kerr-McGee gets its deposit back and loses out on the first leasing in the Continental Shelf, but the firm last week was given the contract to drill The Texas Co.'s first offshore test off the Texas coast. *(See below)*

The Government stands to get some $4,800,000 less from the two disputed blocks as a result of the mixup. Gulf will get Block 155 on the Ship Shoal official leasing map for $200.40 an acre, or $1,002,000 for the 5,000 acres. Kermac's bid offered $433.20 an acre or a total of $2,166,000. Humble will get Block 128 on the South Timbalier map for $102.60 an acre or $513,000 for the 5,000 acres. Kerr-McGee's bid was $833.20 an acre or a total of $4,166,000.

No one else bid on the other seven tracts for which Kerr-McGee mistakenly offered some $8,500,000 thinking it was bidding on Vermilion area tracts.

The decision . . . The decision to return Kermac's deposits without penalty was made by the Acting Comptroller General Frank H. Weitzel. He disagreed with the company's contention that a bidder has the right to withdraw a bid after it is opened but before acceptance, but he said acceptance of a bid with knowledge of an error does not make a valid and binding contract.

Weitzel found the error arose in translating into formal bids a memorandum prepared at a meeting between officials of Kerr-McGee and Phillips Petroleum Co. at which bonus offers were calculated on the nine tracts in the Vermilion area. That memorandum listed block numbers which were thought to be the tract numbers used by the Bureau of Land Management solely for the purpose of the sale.

Since the Comptroller General has jurisdiction over mistake-in-bid cases, Edward Woozley, director of the Bureau of Land Management, immediately released Kermac from any contracts.

The first lease was executed following receipt of a check for $70,720 from Humble to complete the bonus of $88,400 ($17.68 per acre) it offered on Block 165 in the Vermilion area.

Completed leases and bonus checks also are coming in from the other 16 high bidders. The elimination of Kerr-McGee's bids will reduce the government's take from the sale from $129,000,000 to $118,378,476.

Shell Oil Co., sole bidder on the five of 108 tracts offered for sulfur leases, will get the tracts on which it offered $1,233,500.

What they paid . . . Here is what the 17 companies will pay for their "hunting licenses": Gulf Refining Co., $37,239,500; Shell Oil Co., $19,242,000; Phillips Oil Co., $16,764,000; Sinclair Oil & Gas Co., Peoples Production Co., Standard Oil Co. (Ohio), El Paso Natural Gas Co. and Western Natural Gas Co., $12,091,000; Atlantic Refining Co., Tide Water Associated Oil Co., Cities Production Corp. and Continental Oil Co., $7,859,500; Forest Oil Co., $6,100,000; Humble Oil & Refining Co., $6,165,400; Union Producing Co., $4,050,000; Placid Oil Co., $3,145,500; The California Co., $1,227,250; Roy Lee, $1,121,000; The Texas Co., $530,700; Magnolia Petroleum Co., $500,200; Standard Oil Co. (Ohio), $479,651; Stanolind Oil & Gas Co., $166,650; Superior Oil Co., $128,125, and Continental Oil Co., $101,000.

Conservation Here To Stay

Permanent home for the Interstate Oil Compact Commission near the Capitol Plaza in Oklahoma City was dedicated November 16. Gov. Johnston Murray of Oklahoma, commission chairman, hands Earl Foster, executive secretary, the deed to the $75,000, one-story stone and brick structure built under a legislative appropriation from the state conservation fund. The 4,500-sq. ft. building houses the records and the eight employes of the 20-year-old commission, which now includes 28 states. Principal speaker was Commissioner S. L. Digby of the Federal Power Commission, who praised state regulation of oil and gas production and warned against encroachment of the federal Government into this field.

Kermac Gets Texaco Job

HOUSTON.—Kerr-McGee Oil Industries, Inc., has been awarded a contract to drill The Texas Co.'s first test off the Texas coast.

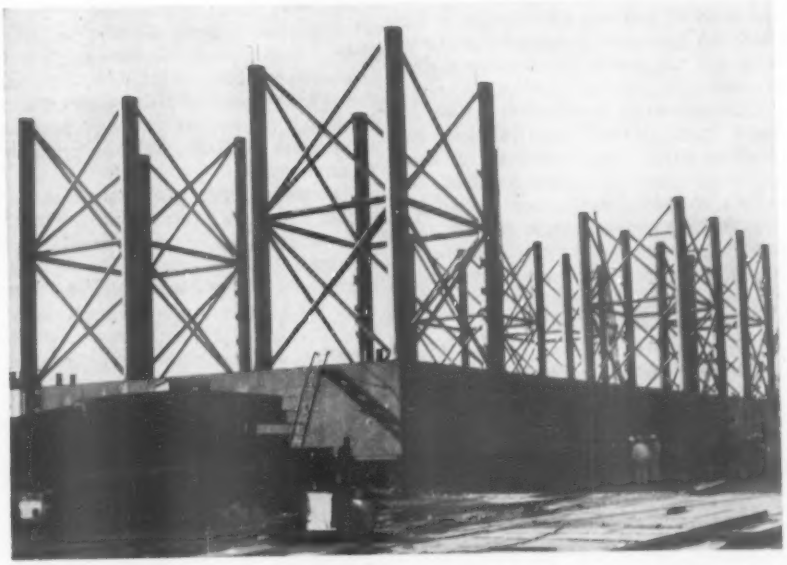
Drilling won't get under way until after December 15 at the location 3 miles off High Island, Galveston County.

The "Kermac 44," a submersible drilling barge that was launched recently, will be moved on location to operate in 29 ft. of water. The well will go to a projected depth of 9,000 ft. in the southwest corner of State Tract 137.

A 76-ft. caisson with a 7½-ft. outside diameter has been driven 32 ft. into the gulf bed. Inside the caisson a conductor pipe, 160 ft. in length, and 30-in. in diameter, has been sunk 118 ft. into the earth.

The Kermac 44 hull will be submerged over this caisson and conductor pipe through which the hole will be drilled.

Two More Drilling Giants . . .



. . . Will Expand Offshore Fleet

NEW ORLEANS.—Two more submersible barges are nearing completion at Alexander Shipyard, Inc., here and will be probing the Gulf of Mexico for oil within a few months.

A 380-ton barge (top photo) being built for American Tidelands Oil Co., New Orleans, is scheduled for completion in December. This unit will be capable of drilling in 45 ft. of water. The barge will be 200 ft. long, 74 ft. wide, and 92 ft. from the bottom of the hull to the helicopter deck. In the photo, the drilling deck is being lifted on to the caissons.

The John Hayward (bottom photo) is being constructed by Ocean Drilling & Exploration Co., also of New Orleans. This is the sister ship to Odeco's other submersible barge, Mr. Charlie. The John Hayward, which will be capable of drilling in 30 ft. of water, is expected to be delivered early next year. Odeco's Mr. Charlie is under lease to Shell Oil Co.

Offshore Suits Threatened

THIBODEAUX, La.—Any oil company that starts operation under a federal lease on tidelands claimed by Louisiana will face a suit by the parish off which the operation is begun. Leander Perez, district attorney, announced here last week.

Nine Louisiana parishes bordering on the gulf have organized to "protect our tidelands interests."

Conroe Still Booming

CONROE, Tex.—Conroe Townsite field now has 22 producers and a cumulative production since January of more than 94,000 bbl. of oil.

Humble Oil & Refining is the major operator in the field, discovered by Moran Utilities and Garflo Oil Corp. in January.

Only one well drilled in the townsite field has been a failure. All the others are making allowables of 82 bbl. daily.

MID-CONTINENT

Arbuckle Tapped

Western Kansas wildcat hits new producing zone

SCOTT CITY, Kans.—Western Kansas has its first Arbuckle lime oil production assured by W. L. Hartman 1 Rush, 10 miles southeast of here in eastern Scott County.

The wildcat produced 6 bbl. of oil per hour after swabbing. Pump is being installed. Production is from perforations at 5,050-54 ft. in the Arbuckle.

Nearest previous production from the Arbuckle was 80 miles east in Rush County's Rush Center field. Before the Scott County discovery, Rush Center field marked the westernmost Arbuckle production in Kansas.

The Mississippian has been the main pay zone in this western area of Kansas.

Tax Cuts May Come

Congress may approve 1½-cent gasoline levy next year, but deficit spells doom for decrease in corporate taxes

WASHINGTON. — The pre-Korean tax of 1½ cents a gallon on gasoline—now 2 cents—and pre-Korean rates on other excise taxes may get through Congress next year.

But, the heavy deficit expected for the fiscal year may postpone the reduction from 52 to 47 per cent in corporate income tax which Congress has already scheduled for April 1.

Washington observers who attempt to forecast congressional attitude toward the President's legislative program in light of Democratic control, expect a sharp fight over the corporation tax. Proposals will probably be made to cut it to 50 per cent as evidence of good faith, but counter proposals will call for an increase to 55 per cent—to permit an increase of $100 in the individual income tax exemption.

Depletion allowance . . . A new attempt to cut the depletion allowance below its present 27½ per cent is considered inevitable. Any consideration by Congress of the corporate and excise taxes will throw the whole tax bill open. In addition to this, the President said last year depletion and certain other taxes would be studied by the Treasury before his administration makes any recommendations. The department is expected to have its report ready early next year.

A strong fight will be made for repeal of the Taft-Hartley Act and resolution of the old Wagner Act which was much tougher on employers. Not even organized labor believes the move will succeed. The best bet is that nothing will be done with the labor law to alter its present make-up materially.

Reciprocal trade . . . This will be another area of controversy, with efforts made to secure better protection for oil producers and other domestic industries. But, it is expected the present law will be extended without material change.

The Defense Production Act, now due to expire June 30, will probably be continued. There is no opposition to the act and the big fight will come over inclusion of standby wage, price, and rent controls for use in case of an emergency.

The Renegotiation Act, which expires December 31, is expected to be continued for another year by Congress. The minimum wage, on which there is no party-line disagreement, will probably be increased from 75 cents to $1 an hour.

Fuel Policy Readied

Cabinet Committee report going to President soon

WASHINGTON.—Just 10 days before they are due on the desk of President Eisenhower, the recommendations of the Cabinet Committee on an energy and fuels policy are receiving final polishing.

The committee has the report of the oil industry task force headed by J. Ed Warren, but what that report contains only the task force and the committee know.

The report is understood to cover every angle of the fuels situation, including coal's complaint that residual oil imports are an expanding threat to its markets, domestic producers' charges that imports generally have reached too high, and the threat to gas industry expansion posed by federal regulation of producers and gatherers.

There has been no indication of how either the task force or the Cabinet Committee stands on such ticklish questions as possible curbs on oil imports. But, the present administration, like its predecessors, follows a policy of expanding international trade by cutting down its barriers. Both the State and Defense Departments have been consistent in stressing the desirability of expanding foreign sources of supply.

Domestic threats . . . Domestic producers are making no secret of their plans to urge Congress to enact some sort of quota or other restrictions on imports. They say importing companies have not taken effective steps to keep imports at the industry-approved level which would "supplement but not supplant" domestic production.

The domestic producers will be joined by the coal industry and probably by the railroads which depend on coal-hauling revenues. Unions from both the mines and the railroads are expected to fall into line, too.

Natural gas . . . It is speculated here that the committee will have some definite things to say about federal regulation of natural gas in view of widespread predictions that it will limit sharply the expansion of gas supplies. So far, the Supreme Court and some of the consuming states are the only groups to favor regulation of producers' prices. The Federal Power Commission is carrying out regulation because it was ordered to—and its members publicly insist the chore is not of their choosing. Many members of Congress feel the Phillips decision was a misinterpretation of the intent of Congress in passing the Natural Gas Act.

Defense Plans Centralized

WASHINGTON.—The Interior Department's defense responsibilities in the field of oil and gas have been wrapped up in one package in a new directive from the Office of Defense Mobilization.

Working under Arthur S. Flemming, mobilization director, Interior will develop exploration, development and production programs for oil and gas as they are needed. This will include screening of requests for tax amortization, loans, guarantees, and procurement contracts.

The department will also formulate orders and regulations for operation of the industry under both partial and full mobilization.

Other responsibilities under the new directive include assembly and evaluation of data on productive capacity and supplies, and establishment or modification of expansion goals.

State Taxes Upheld

WASHINGTON.—Franchise and excise taxes imposed by a state for the privilege of doing business within its borders are not an interference with interstate business.

The Supreme Court last week refused to review a decision of the Tennessee courts in a case brought by the Texas Gas Transmission Corp. challenging validity of the state taxes.

The company operates natural-gas transmission lines from Texas to Ohio, traversing western Tennessee in which it distributes gas. It contended the taxes violated the constitutional prohibition on interference with interstate commerce.

The Tennessee courts said the taxes were imposed on the company for the privilege of doing business within the state and not on its right to do an interstate business.

Court Gets Dispute

Richfield appeals NLRB order on stock purchases

WASHINGTON.—A National Labor Relations Board order that employers must bargain with unions concerning employe stock purchase plans is being tested in the courts.

A suit has been filed by Richfield Oil Corp. in the federal Court of Appeals for the District of Columbia. Richfield seeks a review of an October 18 ruling of the board that the company must negotiate with the Oil Workers International Union on changes in a stock purchase plan adopted in April 1953. *(The Oil and Gas Journal, October 25, 1954, page 76)*

The company plan permits eligible employes to subscribe up to 5 per cent of their pay toward regular stock purchases with Richfield making payments to the stock trustee of 50 to 75 per cent of the employe's contribution, varying according to the company's profits.

The suit maintains the order is invalid as an erroneous interpretation of the Labor-Management Relations Act by the NLRB and encroaches upon the ownership of Richfield and the management, operation and control of its business.

The issue was submitted to the board last November by the O.W.I.U. after Richfield refused to bargain on changes in the plan sought by the union. The board held, however, that plans based on the employment relation and providing for company contributions come under the Taft-Hartley Act.

Purchase Contracts Made

WASHINGTON. — Contracts for purchase of 5,450,000 bbl. of Navy Special fuel oil at a cost of nearly $11,000,000 were announced last week by the Armed Service Petroleum Purchasing Agency.

Awards were made to Richfield Oil Corp. for 2,200,000 bbl. at $4,260,000; General Petroleum Corp., 1,000,000 bbl. for $1,900,000; Sinclair Refining Co., 900,000 bbl. for $2,007,000; The Texas Co., 600,000 bbl. for $1,284,000, and Tide Water Associated Oil Co., 750,000 bbl. for $1,485,000. The last three contracts are for export.

ASPPA also announced that negotiated contracts had been made with British Petroleum Co., Ltd., formerly Anglo-Iranian Oil Co., Cities Service Oil Co., and Socony-Vacuum Oil Co. for 10,388,000 gal. of aviation gasoline and with British Petroleum, Esso Export Corp. and Socony-Vacuum for 9,120,000 gal. of JP-4 jet fuel, but did not disclose the prices to be paid.

WATCHING WASHINGTON

Bertram F. Linz

Tanker Program May Fail

The Government's new-tanker program may fall short of its objective of 30 new super oil carriers.

It now appears that not more than 25 will be secured under the program approved by the past Congress, and that it will take awhile to get those. Congress approved construction of five vessels, but it appropriated only $30,000,000, which will pay for only four.

The Navy was given authority to enter into 10-year charters of new supertankers to be built with private capital, but the industry reportedly has lost much of its original enthusiasm because of a provision that the Navy may buy the vessels at the end of the charter term at depreciated or market value, whichever is lower.

The trade-in legislation under which owners are permitted to turn in 10-year-old T2 tankers for credit against new ships shows signs of working out, but there is a question whether the Maritime Administration has sufficient funds to cover trade-ins on the 10 new tankers it hoped to get built. So far, deals have been made for five new vessels, and negotiations are under way which may result in two or three more.

Depletion Showdown Near?

The long-deferred showdown on the industry's depletion allowance may come next year—and under inauspicious circumstances.

Oil and gas depletion is one of several tax subjects which President Eisenhower said early this year would be specially studied by the Department of Treasury before any recommendations were sent to Congress. The department is expected to submit those recommendations early in the coming session, and there is some expectation that it will call for restrictions on the amount of tax free money operators can get from their producing wells.

Domestic producers are pulling for extending present depletion to past 50 per cent of net profit while leaving the 27½ per cent of gross income alone.

In the Democratic House Rep. Jere Cooper of Tennessee succeeded Daniel A. Reed of New York as chairman of the House ways and means committee, and since Sen. Walter F. George of Georgia is expected to select the chairmanship of the foreign relations committee, Sen. Harry F. Byrd of Virginia will take over the Senate finance committee from Sen. Eugene D. Millikin of Colorado.

While the new House committee may not be favorably inclined toward retention of the present rate, the toughest sledding may come in the Senate. Byrd probably is the most economy-minded of a number of economy-minded members and for years has been driving for government economy and a balanced budget.

The Virginian has a penchant for a balanced-budget Government. His constant bickering with appropriations of former President Harry S. Truman caused Truman to exclaim once, "there are too many Byrds in Congress."

RFDC Faces Difficulties

The Rubber Facilities Disposal Commission may yet be able to sell sufficient plants to meet the minimum requirements of the disposal act. However, whether the commission can present a program suitable to the Democratic Congress in January is now the major question.

The commission is rumored to have agreements with bidders on four or more plants, and these pacts may spur further bidders to sign up. However, since the commission reportedly puts a higher value on the plants than the prospective buyers do, the RFDC still has a lot of selling to accomplish.

Though any sales program must be approved by Department of Justice as not constituting a monopoly, the biggest hurdle will be in Congress. Here the Democrats are expected to oppose the Government's abandonment of its control on synthetic rubber and to disregard any bids which fall short of what they believe the plants are worth.

Although commission officials are not talking about their negotiations, it is reported that some bidders have upped their offers at least twice, while the commission itself is maintaining a firm attitude against anything that smacks of a "giveaway" sale.

Egyptian Deal Signed

Petrofina acquires controlling interest of International Egyptian Oil; company also pushing exploration in Angola

PETROFINA (Cia. Financiere Belge des Petroles, S.A.) has acquired controlling interest in International Egyptian Oil Co. which is doing exploration and development work in Egypt.

The interest was acquired from a Swiss financial group headed by S. de Lazovert, which owned 80 per cent of the company. Another 10 per cent of the company is owned by Southern California Petroleum Corp., which has been handling operations.

Discussing company affairs in New York recently, L. Wolters, managing director of Petrofina, said Petrofina personnel would be introduced into the Egyptian program since it was only natural for technical direction to pass to the oil company now controlling the management.

International Egyptian holds 123 exploration licenses in Egypt. Nine of these, granted only recently, cover areas in Sinai, the Eastern Desert, and offshore in the Gulf of Suez. The company is planning in the near future to begin commercial production of its two shut-in wells at Wadi Feiran in southern Sinai. One of these was drilled by Standard Oil Co. of Egypt in 1948 before it abandoned the area. The other was drilled by Southern California for International Egyptian last year.

Company background . . . Petrofina is a Belgian company controlling refining, marketing, and tanker companies operating in Europe and Africa. It has been expanding aggressively in Canada, and holds a large interest in Mexican American Independent Co. It is exploring in Portuguese Angola and handling another program in the Belgian Congo on behalf of a syndicate of industrial and government interests.

African operations . . . Promising shows of light (32° gravity) oil were obtained in the Santiago and Cacoba wells in Angola, but the light rig could not carry the well as deep as desired. A heavy Ideal rig has since been brought in and another test, Benfica, has been undertaken a short distance south of Luanda on the coast. This location was selected because of its accessibility and also because it was felt it would allow testing more nearly the center of the basin.

The light rig formerly used in the program in Angola took the Cacoba well to about 1,500 meters or about 4,900 ft. It has been moved to the Belgian Congo for use in the exploration there.

Other activities . . . The grant of a concession in northern Belgium to Petrofina is anticipated in the near future. Here the company is associated with mining interests that are active in the area. In the summer of 1953, both Petrofina and the Shell organization applied for concessions over roughly the same area, about 266,000 acres in the provinces of Limberg and Antwerp adjacent to the Netherlands frontier. The Shell application was later withdrawn.

In Mexico, certain outstanding questions concerning Mexican American Independent's activities are being discussed with Petroleos Mexicanos. The company's operations are being held in abeyance while these questions are pending.

Cuban Well Passes Target

THE Cuban American Oil Co. passed the 5,000-ft. mark—well past the tentatively projected 4,000-ft. total depth—early last week at its 1 Adelaide wildcat in Cuba's central basin 275 miles east of Havana.

W. H. Cardwell, chief geologist, said the well was still in good sedimentary section and that it has not been decided how deep the test will be drilled.

An electric-logging unit recently was brought into the country by Halliburton Oil Well Cementing Co., and a log is scheduled to be run shortly. Results of the log may in part decide total depth of the wildcat, Cardwell said.

So far the well has encountered only two small noncommercial shows of oil between 2,500 and 3,000 ft.

The Cuban American wildcat is about 8 miles northeast of the Echeverria discovery which was completed in a 30-ft. Cretaceous sand section at about 1,080 ft.

Cardwell said Cuban American probably will not spot location for further tests until the 1 Adelaide has been completed. The company's contract with Trans-Cuba Oil Co. and Cuban-Venezuelan Oil Voting Trust calls for the drilling of 40,000 ft.

Exploration In East Africa

This shot-hole rig is operating in Zanzibar, East Africa, where a joint company representing the former Anglo-Iranian Oil Co., Ltd., now known as British Petroleum Co., Ltd., and Royal Dutch-Shell is doing exploratory work. As a result of geological and geophysical work, D'Arcy-Shell Petroleum Co. of Tanganyika, Ltd., is making preparations for the first well to be drilled on the island of Mafia off the Tanganyika coast. (British Petroleum Photo)

New Oil Law Urged

Brazilian proposal would allow private exploration

GROWING pressure inside Brazil for modification of the state-monopoly petroleum policy has brought a proposal for amending legislation in the Chamber of Deputies.

Campos Vergal, deputy from Sao Paulo, told fellow members of the chamber that he would introduce a bill in about a week to open the country to exploration and development by private Brazilian companies, which would include the local subsidiaries of foreign firms.

Vergal declared that the Petrobras law has worked against the economy of the republic by barring private capital from oil development work. The law, passed about a year ago, placed all petroleum operations, with the exception of marketing, under control of the new state company, Petrobras.

There has been evidence of a growing campaign against the Petrobras policy since the death last summer of President Getulio Vargas, who had been a principal advocate of the state monopoly. Although his successor, President Café Filho, has taken a neutral position, various influential persons in Brazil have spoken out against the prohibition of private capital in the industry. *(The Oil and Gas Journal, November 8, page 132).*

Effect on economy . . . The serious effect on the national economy from the lack of substantial domestic production was reflected in figures published recently by the Conjuntura Economica in Rio de Janeiro in a study analyzing the country's petroleum position.

Conjuntura Economica, which is a part of the center of economic and business research in Brazil, pointed out that petroleum consumption in Brazil increased by 184 per cent during the 5-year period, 1950-54, and that the import bill for petroleum during this period reached a total of 19.6 billion cruzeiros, representing 15 per cent of all imports.

According to the analysis, income from coffee exports to hard-currency areas in 1954 will amount to about $640,000,000. This accounts for 60 per cent of total income from exports to these areas. Expenditures for petroleum products probably will come to $250,000,000, or 39 per cent of the income from coffee exports. In the second half of 1954, petroleum products will cost $135,000,000, and of this, $15,000,000 will be in sterling, and the remainder in dollars.

Conjuntura Economica said production from the Cubatao refinery should permit a $20,000,000 reduction in hard currency expenditures annually. In addition, the increased output of the Mataripe refinery and the production of the new privately-owned refineries should result in an estimated saving of approximately $30,000,000 a year.

Boundary to Be Set

Nations will arbitrate dispute over oil lands

ARBITRATION machinery is being set up to decide boundaries of the much-disputed frontier between Saudi Arabia and the Trucial Coast shaikhdoms.

Much of the area involved is potential oil country. An Iraq Petroleum Co., Ltd., subsidiary already has made a discovery in Abu Dhabi. Cities Service Co. and Richfield Oil Corp. jointly are preparing to drill inland from the coast of Dhofar.

Drilling In Britain

A number of shallow wells are being drilled in Britain as a part of the British Gas Council's 5-year program of exploration for natural gas. This is the first well undertaken, Ashdown 1, near Crowborough Warren, Sussex. It is being drilled in an area of Jurassic prospects, and some shows were obtained during the summer when it reached 831 ft. The Gas Council launched its program early this year with technical planning and execution provided by D'Arcy Exploration Co., Ltd., (Anglo-Iranian). Rising coal prices and a scarcity of good carbonizing grades for gas manufacture led to the Gas Council's effort. The equivalent of $2,800,000 will be spent during the 5-year period.

Saudi Arabia agreed with Britain July 30 to establish an independent arbitration tribunal which would settle the Trucial Coast boundary. Britain by treaty handles the foreign relations of the smaller Persian Gulf states.

The decision to arbitrate came after a serious dispute between Britain and Saudi Arabia over the Buraimi Oasis which is claimed by Saudi Arabia, Abu Dhabi, and the Muscat and Oman sultanate. A recent report from London said that Shaikh Yussef Yusin of Saudi Arabia and Sir Raeder Bullard of Britain had been appointed to the arbitration tribunal and that they already had agreed on the three other members.

Kuwait Sets New Record

A new production record for the Middle East has been reported in Kuwait.

During October, output in this Persian Gulf shaikhdom averaged 1,069,700 bbl. daily. Previous high in Kuwait was last March when output was 1,012,200 bbl. daily. The Kuwait production is by Kuwait Oil Co., Ltd., which is owned by Gulf Oil Corp. and Anglo-Iranian Oil Co., Ltd.

Previous high in the Middle East was the 1,026,800 bbl. daily produced by Arabian American Oil Co. in Saudi Arabia last May. October production in Saudi Arabia was 961,500 bbl. daily.

Despite Kuwait's record-high output in October, Saudi Arabia still leads in production for the first 10 months of 1954. Its production during this period was 956,700 bbl. daily against 937,100 bbl. daily in Kuwait.

Consumption Rising

Increase of 7.6 per cent seen in Western Europe

CONSUMPTION of petroleum products in Western Europe will show a gain of 7.6 per cent this year over 1953, but smaller increases are anticipated in 1955 and 1956.

This is the forecast of the Oil Committee of the Organization for European Economic Cooperation. The 7.6 per cent gain in 1954 compares to an increase of only about 1 per cent in United States demand this year.

The continued sizable increase in European petroleum consumption points up the great potentialities of liquid fuels in this part of the world. But even with the expected increase, per capita consumption will remain far below the United States.

The OEEC estimates inland consumption—this is consumption exclu-

sive of oil to fuel ships in international trade—in Western Europe in 1954 will be 1,398,000 daily. This compares with 1,299,000 bbl. daily during 1953. These and all additional figures were converted from metric tons on the basis of one million tons equaling 20,000 bbl. daily.

This consumption is expected to rise to 1,476,000 bbl. daily in 1955 for a gain of 5.6 per cent, and to 1,550,000 bbl. daily in 1956 for a gain of 5 per cent.

Total consumption, including ships bunkers, is placed at 1,602,000 bbl. daily this year, 1,678,000 bbl. daily in 1955, and 1,752,000 bbl. daily in 1956. Little change was predicted in the pattern of consumption among the different major petroleum products.

Refining outlook . . . The OEEC estimated that by the end of 1956 Western Europe will have a maximum potential distillation capacity in its refineries of 2,246,000 bbl. daily. At the end of 1953, capacity was 2,008,000 bbl. daily as compared to 1,642,000 bbl. daily at the end of 1952.

It was estimated that during the current year European refineries will process an average of 1,870,000 bbl. daily of crude oil, and that this will rise to 1,904,000 bbl. daily in 1955 and 1,960,000 bbl. daily in 1956. Total output of products was 1,522,000 bbl. daily in 1953. It is expected to amount to 1,684,000 bbl. daily during the current year.

Wafra Gets New Pay

Neutral Zone well flows 100 bbl. hourly on test

A NEW producing zone has been tapped in the fast-growing Wafra oil field of the Saudi Arabia-Kuwait Neutral Zone.

The discovery, a joint venture of American Independent Oil Co. and Pacific Western Oil Corp., flowed 25.6°-gravity oil at a calculated rate of 2,400 bbl. daily on a drill-stem test of the Ratawi limestone at about 6,760 ft.

Three tests were made after coring the interval between 6,760 ft. and 6,837 ft. Operators were coring ahead in the same formation at last report.

The well originally was intended to test the Arab zones at depths of about 7,500 to 8,000 ft. A spokesman for Aminoil said the well may be drilled to projected depth after the current strike is tested further.

The Ratawi horizon is not productive anywhere else in the Middle East. Thickness of the pay zone encountered in the current test is not yet known.

Other wells . . . American Independent and Pacific Western have 15 wells producing oil from the Burgan sand in the Wafra area. This zone is topped at about 3,500 ft.

The operators currently are drilling a wildcat in the western part of the Neutral Zone, about 15 miles west and slightly north of present production. This well, the 1 Graya, is projected to the Burgan zone.

Wafra field was discovered early in 1953. Five dry holes and expenditure of an estimated $30,000,000 in exploration preceded the first strike. Current production from the field is about 20,000 bbl. daily.

Refinery Bomb Shelter Has Peacetime Use

Few refineries can claim such an unu-ual structure as this. It is a World War II bomb shelter located on the grounds of Socony-Vacuum's refinery at Naples, Italy. The structure now houses the refinery telephone exchange and, with an eye to beautification, p'ant personnel have set out vines which they hope will eventually cover the pointed roof. The Naples refinery, with a capacity of about 60,000 bbl. daily and a large export market, ranks as the largest in Italy (Socony-Vacuum photo).

International Briefs

A $28,000,000 power plant to operate on natural gas from Pakistan's Sui field has been contracted with British firms by the Pakistan Industrial Development Corp. The plant is to be located in the Punjab. Sui field was discovered in 1952 by a Burmah Oil Co., Ltd., subsidiary and is now being given an outlet by a 350-mile, 16-in. pipeline under construction to Karachi.

Further incentives for the investment of foreign capital in Pakistan have been placed in effect by the Pakistan Government. Investments, including ploughed-back profits, are allowed unrestricted repatriation. "Just and equitable compensation" in case of nationalization also is freely remittable. In addition, foreign investors can own up to 60 per cent of the capital in approved industries instead of the previous maximum of 49 per cent.

Tide Water Associated Oil Co. has contracted Mitsubishi Shipbuilding & Engineering Co., Ltd. of Japan to construct two identical 45,000-deadweight ton tankers. The ships will measure 735 ft. in length and will move 300,000 bbl. of petroleum products at 16.5 knots. The two tankers will be built at Nagasaki for delivery in December, 1955 and March, 1956. Cost of the two tankers will be $10 million.

The first joint exhibition of chemical plant and petroleum equipment to be held in the United Kingdom will be held in the Grand Hall, Olympia, London in June 1958. It will be organized by F. W. Bridges & Sons, Ltd., and sponsored jointly by the British Chemical Plant Manufacturers Association, and the Council of British Manufacturers of Petroleum Equipment.

Shell Chemical (Australia) Pty., Ltd., has been incorporated in Australia. The new company will distribute chemicals and manufacture them locallly as circumstances warrant. E. N. Avery, chairman of the Shell Co. of Australia, Ltd., is chairman of the new company, and T. W. Henderson, its managing director.

Big Line Sought in Africa

Product carrier would compete with state railroads and synthetic-gasoline plant now nearing completion

THE South African Government is being asked to authorize a products pipeline which would be embarrassing competition for the state-owned railroads.

What's more, the line is apt to upset the already questionable economic justification for the huge SASOL coal-to-oil synthesis plant. The Union Government will have spent close to $92,500,000 on this project by the time it goes into operation early next spring.

The pipeline would run from the coast to the Rand, a distance of about 350 miles along the pipeline route. The Rand is the plateau area in southern Transvaal where the gold mines are located and where there is heavy petroleum consumption.

The possibility of constructing such a line has been talked for several years. In recent weeks, however, route surveys have been undertaken by a new company, Overland Pipeline Corp., which was organized in South Africa to undertake the project. Cost is estimated at $8,450,000.

Previously rejected . . . The government has balked at previous requests for approval of the pipeline. Part of the opposition has come from the government-owned railroads which contend the line would not be economic.

The charge for moving gasoline from the coast to Johannesburg on the present railroad system is the equivalent of 9.4 cents a gal. (U.S.). Estimates indicate a pipeline could deliver gasoline from the coast for a fraction of this amount.

Rising petroleum consumption has taxed the railroads' ability to move the products needed. The railroads have not been able to maintain sufficient supplies in the interior to meet seasonal demand fluctuations, even though stocks were adequate on the coast and storage space was available at inland terminals.

Economics . . . First synthetic gasoline from the SASOL (South African Oil, Coal & Gas Corp.) project is expected to be on the market next April. This mammoth undertaking for which M. W. Kellogg has the contract has been under construction several years. It will produce about 4,300 bbl. daily of motor fuel, plus smaller quantities of gas oil and fuel oil, in addition to a line of industrial chemicals.

While some details on the costs of the SASOL project are lacking, whatever advantage its production will have will be due to two factors—the very cheap coal available, and the high freight for imported products from the coast.

A large volume of products moving from the coast probably could be sold at a cheaper price than SASOL's output, since the relatively low costs of coal for the synthesis operation have been offset by the large capital requirements. When the project was first started, the government allotted about $50,000,000. Final costs will be almost twice that sum.

P. E. Rousseau, SASOL managing director, said recently the cost of coal at the plant would be only about 49½ cents a ton and that the coal required for a gallon of gasoline thus would cost the equivalent of only 2.4 cents. He placed the production costs for SASOL gasoline at the equivalent of 13.7 cents a gallon. Present cost of imported gasoline, at coastal ports, is about 12 cents per gallon.

Island Acreage Taken

New company will explore large Philippine blocks

A NEWLY organized company, San Jose Oil Co., has filed on large blocks of acreage in the Philippine Islands.

The company, equally owned by Pantepec Oil Co. and Pancoastal Oil Co., applied for 650,000 hectares, or about 1,600,000 acres, November 6.

Another 350,000 hectares, or about 865,000 acres, has been earmarked by the company but is subject to prior rights according to an agreement with the government. The company plans to begin exploration next year and has set aside $250,000, most of which will be used for an aerial magnetometer survey.

Other concessions . . . Several months ago, American Overseas Petroleum, Ltd., (Caltex), took out exploratory concessions on 1,230,000 acres in the Cagayan Valley in northern Luzon. This area is now completely covered by Amoseas concessions or by applications of the Philippine Oil Development Co. and Standard-Vacuum Oil Co.

The blocks taken by the new San Jose company include acreage north of Lingayan Gulf and in Mindanao.

New Cat Cracker In West Germany

The new fluid cata'ytic cracking unit of about 10,000 bbl. daily capacity at the Hamburg refinery of Esso, A.G., is representative of the numerous secondary-processing units added during the past year at refineries in Western Europe. Esso's Hamburg refinery has a capacity of about 37,000 bbl. daily and ranks as the largest in West Germany.

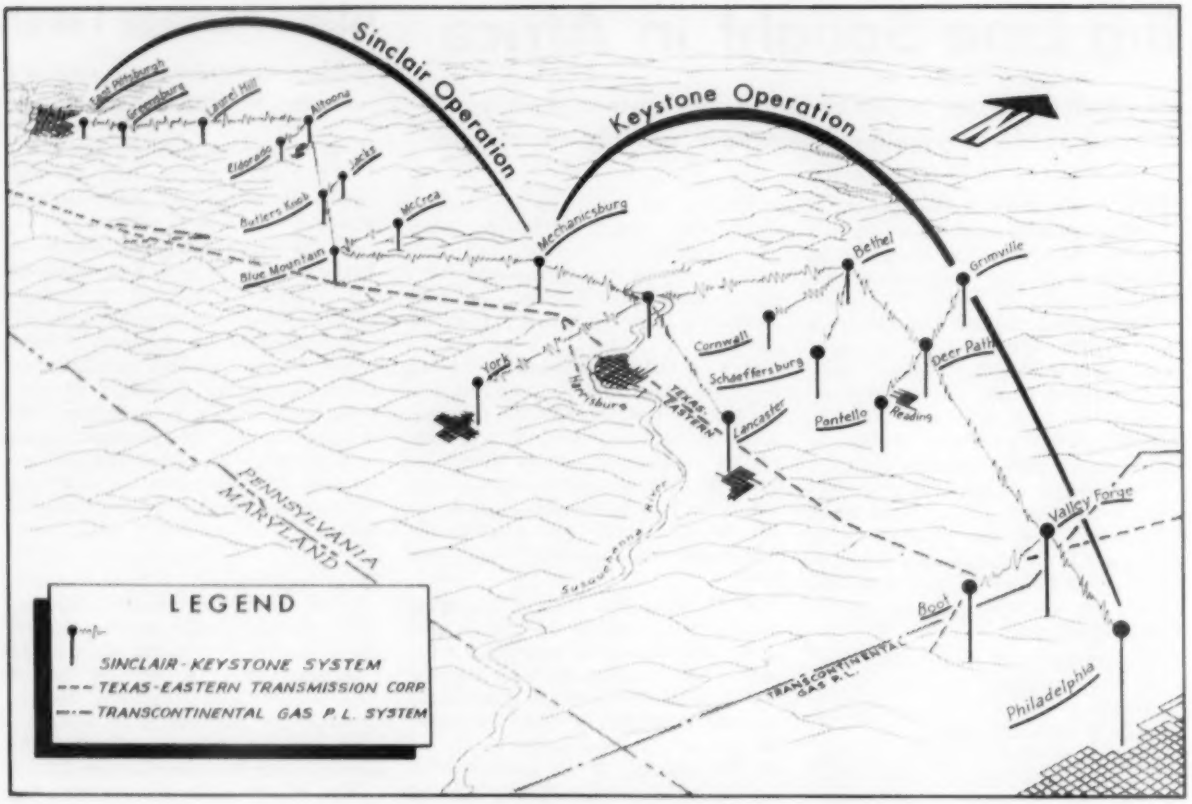


Fig. 1—Microwave system of Keystone and Sinclair Pipe Line companies.

Have you thought of

SHARING A MICROWAVE SYSTEM?

High initial costs and low channel utilization may make the construction of a microwave system unattractive—unless, as Keystone and Sinclair did, two or more companies split building and operating costs.

by M. S. Collett

TO overcome the economic obstacles in the path of constructing private microwave systems where communication requirements are relatively small, Keystone Pipe Line Co. and Sinclair Pipe Line Co. have established a jointly operated system across the State of Pennsylvania to serve the needs of both companies in that area. This joint operation, which was completed in July 1954, allows both companies to enjoy the inherent advantages of private microwave operations for approximately 60 per cent of the cost of two independent systems.

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High construction costs . . . The fact that few new microwave systems have been started in the past 2 years may be an indication that the cost of microwave construction is becoming increasingly hard to justify. There may be other reasons for the slowdown but the cost picture is what led to the joint venture operation between Keystone and Sinclair.

A company considering the construction of a new microwave system today soon comes up against the hard economic fact that an average system costs approximately $1,200 a mile to construct and approximately $170 a mile per year to operate, including depreciation. This annual cost is equivalent to the cost of leasing one dispatch circuit plus two or three additional business circuits. Pipeliners are a talkative group, perhaps, but there are not many pipelines which do this much official talking. Some, in fact, operate with only a single dispatch circuit—telephone or teletype.

However, for many pipeline companies caught in the postwar spiral of increased throughput, increased pressures, and increased costs, the additional communications circuits which were once luxuries have become today's necessities. Business circuits have been added to coordinate district activities, VHF

Fig. 2—Keystone-Sinclair microwave relay station at Blue Mountain. The poured-concrete building was constructed by Sinclair at an elevation of 2,360 ft.

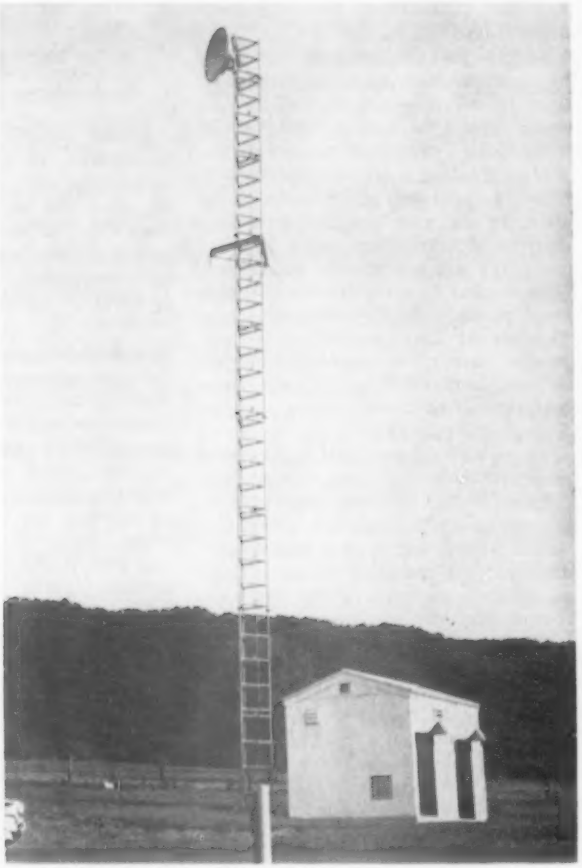


Fig. 3—Microwave drop station constructed by Keystone at McCrea, Pa., for drop circuits to the Blue Mountain pump station. Tower is 80 ft. high.

control circuits have been installed to supply communications to mobile units, and remote-control circuits are now appearing to permit the unattended operation of pump-station facilities. Even so, there are but few companies which have foreseeable need for all of the 24 to 32 voice circuits which are available on the modern microwave system.

F.C.C. approval . . . To the practical mind this situation immediately suggests that perhaps two or more companies might build a joint microwave system to share the circuits and to split the costs. The first requisite for such an idea is to obtain the informal approval of the Federal Communications Commission regarding the proposed joint venture, inasmuch as this governmental agency controls the use of all radio frequencies. As of today, the commission's policy on joint microwave operations has not been finalized. However, because the idea of sharing radio frequencies and conserving radio-spectrum space is basically in the public interest, the commisison has looked with favor on joint operations. Before any plan is approved for sharing an industrial radio frequency, the commission must determine if the following facts apply:

1. Each of the partners in the proposed sharing arrangement must be eligible for the service in his own right.

2. All of the partners must be eligible in the same radio service.

3. The proposed arrangement must be strictly nonprofit.

4. The operating responsibility for the individual radio stations must be retained by a single company, and the stations must be licensed in the name of that company.

There are a number of ways to set up the financial arrangements for a joint nonprofit microwave operation which the commission may approve on a developmental basis. For most of us the capital-investment picture is the difficult one. This suggests that the best way to arrange a joint microwave operation is to arrive at some equitable method of splitting the first cost as well as the operating costs.

Many problems . . . The second problem in promoting a microwave partnership is to find a partner, or partners. This is not as easy as it sounds. Perhaps this can best be illustrated by telling the story of the Trans Pennsylvania microwave system which was proposed in 1951. Before describing this system, it should be pointed out that building a pipeline microwave system in mountainous Pennsylvania is expensive; perhaps 50 per cent more expensive than in flat country. To cross the Pennsylvania mountains with microwave requires that the majority of the stations be located on the mountain tops. On the other hand, the pump stations and delivery terminals on the pipeline are generally located in the valleys. This means that a pipeline microwave system across Pennsylvania will probably become a system of backbone stations to get across the mountains, with a connecting group of microwave side hops or wire lines extending into the valleys.

The proposal for the Trans Pennsylvania system developed as a natural result of the fact that there are five different product pipelines crossing Pennsylvania from east to west,

and that each has at least one communications circuit.

In 1951 an extensive study was made by the companies operating these pipelines to see if a common microwave system could be built to serve all of them. This system was never built for several reasons. First, the pipelines are closely parallel only in the center of the state. In the east and the west they diverge widely. Many miles of wire and many side-hop stations would have been needed to serve the widely scattered points requiring communications. This would have resulted in an expensive system of approximately 60 stations, or about three times the number required to serve a single pipeline. Second, the operation of the system as a separate, nonprofit corporation promised to be both complex and expensive. Third, the communication requirements of the different companies varied greatly, and it soon became evident that the proposed system offered no economy to those having minimum communication requirements.

Joint venture attractive . . . As a result of this study three of the companies lost interest in the proposal, and the remaining two, Keystone and Sinclair, decided to take another close look at a joint two-company operation. As it turned out, the situation proved favorable to the construction of a common microwave system. The two companies' pipelines were closely parallel all the way from Philadelphia to Pittsburgh, and the terminals and pump stations were usually separated by only a few miles. In addition, each company had a background of practical experience in operating its own communication services, and each had an immediate need to expand and improve these services in Pennsylvania.

After a careful engineering study a joint system was laid out consisting of a total of 22 stations—12 in the main backbone across the state, and 10 side-hop stations into the valleys. Sixteen of these stations were for joint use, three were for Keystone's use alone, and three were for Sinclair's use alone. The total system was to consist of 432 miles of microwave and 100 miles of privately owned or leased wire circuits (see Fig. 1). A maximum of 9 circuits out of an available 23 was to be installed on the system leaving Philadelphia. A total of 2,400 microwave circuit miles was to be installed out of a possible 10,000.

It was feasible, then, to put together a joint microwave system across the state with a total of 22 stations. If Sinclair and Keystone were to build independent systems, the 16 jointly used stations would be duplicated to raise the total to 38. In round figures this meant that the joint system could be constructed for about 60 per cent of the total cost of two independent systems. This 40 per cent saving in capital cost made the microwave picture much more attractive to the respective managements.

"No serious difficulties whatever have developed with the system or with the equipment. Its present operation is highly satisfactory to both companies."

Responsibility shared . . . Bids were taken on equipment, and estimates were made to calculate the system cost; but it was not easy for Keystone and Sinclair to arrive at a satisfactory method of splitting this cost. Finally a happy solution was found in the simple idea of splitting the construction responsibility. Under this plan Sinclair built and equipped eight of the jointly used stations from Mechanicsburg west, whereas Keystone contributed five stations in its original system in the east plus three other new jointly used stations. Of course, each pipeline built the stations which served only its own facilities. Each furnished the equipment required to equip its own communication channels.

This plan of construction allowed each company, within limits, to construct the buildings, towers, roads, etc., to suit the ideas of its own engineers and management. Sinclair constructed buildings and poured concrete and used rectangular, painted towers with four sets of guys (see Fig. 2). Keystone constructed prefabricated metal buildings insulated with asbestos and Celotex and used triangular galvanized towers with three sets of guys (see Fig. 3). Both types of buildings were provided with separate engine generator rooms and with thermostatically controlled fans for forced ventilation.

The successful low bidder for the microwave equipment on both parts of the system was Federal Telephone & Radio Corp., the company which had supplied the original Keystone system. This facilitated the reworking of the original system to modernize it with such features as antenna duplexes, standby RF, pulse restorers, and automatic alarm.

Lower maintenance costs . . . The maintenance of two independent systems across the state would have required at least three technicians for each system. The joint Keystone-Sinclair system is maintained by a total of four technicians. From Mechanicsburg east all of the microwave equipment and circuit apparatus for both Keystone and Sinclair are maintained by two Keystone technicians. From Mechanicsburg west, all equipment is maintained by two Sinclair technicians. The facilities and stations used by both parties are owned jointly, but in line with operational responsibility each company has leased to the other its interests in the system which fall in the other's area of responsibility. Station licenses are, of course, held by the company responsible for the operation of the station.

The operation of a complex communications system on a joint basis by two pipelines is something entirely new in the field of petroleum communications. Of course, there had been drawn up early in the negotiations a lengthy legal agreement covering all foreseeable possibilities, but the ultimate success of the joint operation would not have been possible without the understanding and good will which has existed between the two managements and between the two communications departments.

The completed joint system was cutover for full normal operation in July of this year. The cutover and run-in period of any microwave system is no honeymoon for those who have to "debug" the installation and ferret out system peculiarities. However, in less than 3 months the new system settled down to a fully satisfactory routine operation. No serious difficulties whatsoever have developed with the system or with the equipment. Its present operation is highly satisfactory to both companies.

Success points way . . . The joint construction of the Keystone - Sinclair microwave system is a new venture in industrial communications. Its success has made it possible for both companies to take advantage of the inherent benefits of private microwave communications at a greatly reduced cost. Today a crystal ball is not required to foresee an ever-increasing requirement in the petroleum industry for communication circuits. This is particularly true in pipeline operations, inasmuch as many of the technical advancements now available for pipeline operations are dependent upon enlarged communication facilities. The most flexible and reliable way of providing these facilities is through the establishment of private microwave systems. Thus successful microwave joint operation points out one way of overcoming the economic obstacles in the path of private pipeline microwave systems.

Want to Be a Better Supervisor?

Maybe these tested tips will be helpful

There's no pat formula or neat set of rules for improving your ability to supervise the work of others. But there certainly are broad principles of psychology, human relations, and work organization that can serve as your guide in working to improve your supervisory efficiency. The nine principles covered here are such "guiding lights." Prepared by Elliot Service Co. of Mount Vernon, N. Y., for publication in their weekly bulletin, "Management Information," these tips offer a wealth of ideas that you can use to make yourself a *better* supervisor.

1. How to get the most out of interviews:

What is an interview? It's not just a formal question-and-answer procedure for hiring or "exiting" employes. "Mr. Webster" suggests a much broader idea. The dictionary describes an interview as a "meeting face to face; a consultation." It's an interchange of views.

Dozens of situations arise every day when there is a need for a face-to-face sharing of views between a supervisor and one of his men. Some examples:

- When a problem comes up which calls for cooperation or exchange of ideas
- When a supervisor wants to sell or explain a change in policy, work methods, job assignments, or safety rules
- When a man has a grievance, or thinks he has
- When a supervisor needs to gather the facts
- When there is a personal problem—between employes, between himself and one of the men, or when a man has an individual problem.

Seven practical principles . . . When needs of this kind arise, we should be ready to apply the principles of sound interviewing. Here are seven basic rules for making your interviews pay off in greater understanding.

1. Show a genuine interest in the man's ideas and views. He's not apt to be interested in your views unless he is sure you are interested in his.

2. Have a time plan and stick to it. Start and finish the interview on time. Don't promise that, "This will only take a minute," when it may actually take fifteen.

3. At the outset, agree on the purpose and objectives of the interview, so as to avoid being sidetracked.

4. Think and talk "we" not "I" to establish a common cause and a sound reason for view-sharing.

5. Don't interrupt and, above all, don't steal the other man's "punch line." You know how you feel when some one beats you to the punch line, when you are telling your favorite story. Same thing—let the other fellow finish expressing himself.

6. Draw out the man by asking questions (How? What? When? Where? Why?) that invite opinions, not just nods, groans, "yeses" or "noes."

7. Wind up the interview on a note of accomplishment. Conclude briefly by restating any decisions or agreements reached.

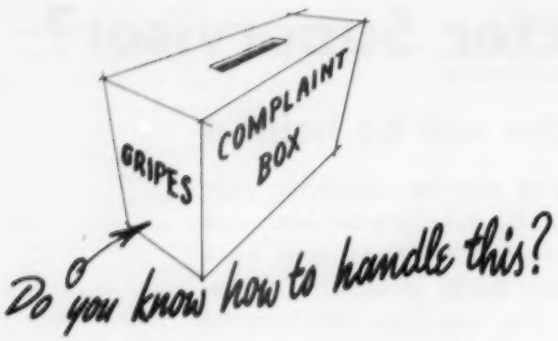
Teamwork between the supervisor and the group he supervises depends on mutual understanding. The basic responsibility for developing understanding lies with the supervisor.

2. Don't let gripes become grievances!

"Oh, baloney!" was the department foreman's first answer to an employe who complained that he was not getting his share of the high-rated jobs. "I'd be doing nothing else if I had to check the records every time one of you guys has a gripe about the assignment."

At one time or another, we have probably all been tempted to push aside gripes and complaints the way this foreman did. But usually, gripes and minor complaints which are not attended to become the source, later on, of such problems as these:

- A major grievance can develop.
- The gripe may be passed along and so lead to complaints from others.
- Lack of action may undermine confidence in the supervisor's judgment.



What makes a gripe? . . . A man **has** a gripe, if he **thinks** he has one—if he feels that in some way he is not getting a "fair shake." So he makes an offhand remark or asks a question to see where he stands. Some of the most common causes of gripes are misunderstandings about pay. Favoritism, real or imagined. Unexplained instructions or changes. Schedule annoyances. Irritations due to working conditions. Supervisors' habits or mannerisms. And you can add others from your own experiences.

Before the grievance grows . . . We can avoid the growth of most grievances by getting to the root of the problem early. Here are some suggestions for dealing with gripes promptly and fairly.

1. Know a gripe when you hear one. Be alert to employes' questions and comments that may indicate sources of dissatisfaction.
2. Give the man a chance to get his gripe off his chest. Hear him out, with genuine interest.
3. Get the story straight with all the facts, so that snap judgments are avoided.
4. Avoid arguments. You can't "win" a gripe, but you can lose a grievance.
5. Be willing to admit mistakes and to take corrective steps quickly when a complaint is justified.
6. Accept responsibility for adjusting gripes. If the buck is passed, the man with the complaint feels he's being stalled.
7. Learn from past experiences with gripes and grievances to prevent similar problems from recurring.

Alert supervisors can avoid serious grievances by dealing promptly with minor irritations, complaints, and gripes.

"Most of the great fires of history could have been put out with a teacup of water used at the right time."

3. How thorough is your breaking-in technique?

Two incidents, within a few days of each other, brought home to one supervisor the importance of a standard procedure for induction or breaking in of new employes.

The turnover in Supervisor Pellman's department was small and new employes were rarely added. When a new man did come in, Pellman would take him around and "show him the ropes."

It happened that two new men had recently been added—one to replace a man who died and the other to be broken in as a replacement for a man who would be retiring in a few months.

Embarrassing incidents . . . The first incident concerned Ben Tiller, one of the new men. The supervisor wanted to send a note to an inspector who was working in another part of the building. Tiller, the new man, happened to be the only employe available to deliver the note.

"Take this to Trenchard over in Section 3," he instructed the new man.

"Who's Trenchard?" Tiller asked.

"He's the inspector. I pointed him out to you the first day you were here. He's the big fellow, with bushy hair." The supervisor was impatient.

"You pointed him out, but you didn't tell me his name," Tiller answered, flushing. "I know who you mean when you describe him."

The second incident involved the other new man. The plant nurse phoned to say that one of Pellman's men had come to her with a cut finger, but he didn't have a pass and said he hadn't spoken to his supervisor before leaving the department.

Pellman explained that he was new and probably didn't quite understand the proper procedure. It bothered Pell-

Breaking-in check list

Show location of time clock, wash room, drinking fountain, dressing room, plant nurse, supplies, broken parts bin, tools, and equipment.

Show employe around the department.

Introduce employe to fellow employes and supervisors he will work near, or is likely to have contact with.

Be sure he understands:

(a) His working hours.
(b) How to punch in and out.
(c) The overtime and vacation policy of the company.
(d) What to do if he must be absent.
(e) How to report an injury or accident.
(f) How to make an outside telephone call, if necessary.

Explain how employe's job fits into the over-all operation.

man, however, to have the nurse calling his attention to a matter like this. He thought back to the day he had broken in this man. He had been interrupted, and had never gotten back to cover the last few points which included the matter of getting a pass to see the nurse.

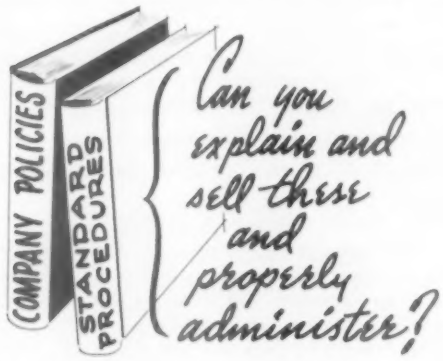
Check list for future use . . . He decided that, no matter how few new employes he had to induct, he should have a written list of points to cover with every new employe. Having relatively few new employes made it easy to overlook one or two important items.

So, he wrote down every item he could think of that should be covered. He worked on this list over a period of several days, adding other points, as they occurred to him. Finally, he had the check list shown on previous page.

Proved by experience . . . He put this check list in a place where he could find it easily, whenever a new employe came in. Then, he made sure that the induction of Tiller and the other new man was completed on all counts.

Then, Pellman felt confident that further embarrassing incidents of the kind that had recently occurred would be much less likely to happen in the future. And experience has proved that he was right.

4. Helpful hints on selling company policy



Q. What are some pointers to follow in selling employes on the fairness and reasonableness of a policy?

A. Follow these suggestions:

- The supervisor must fully understand the policy himself.
- Explain clearly and give full reasons for the policy.
- Explain how the policy affects and benefits employes.
- Give employes advance notice on any new policy. Don't "spring" it on them.
- Give employes the opportunity to voice any reactions or to raise questions.
- Be fair and consistent in carrying out the policy. Don't just preach about its fairness.

Q. Where can a supervisor go to get help on how to interpret a policy to employes?

A. He can consult his immediate superior or any staff specialist who has the responsibility for providing advice on policies.

Q. What happens when policies are not uniformly or consistently administered throughout all departments or divisions of a company?

A. Grievances and inefficiency will result. Also, employes will become suspicious, antagonistic, and insecure.

Q. What's the difference between a policy and a standard procedure?

A. A policy states the rules or regulations to be followed; a standard procedure states the steps to be followed in carrying out that policy. For example, one company has a personnel policy that qualified employes will be promoted from within the organization when jobs of higher responsibility are vacant. The company's standard procedure provides such information as the manner in which the vacancy is to be announced, by what "yardstick" the qualifications of candidates are to be judged, and who has responsibility for final selection.

Q. How can standard procedures aid in carrying out policies?

A. 1. They help a supervisor follow the organizational channels and the best sequence of steps in putting a policy into effect.

2. They state the manner in which policy decisions are to be properly recorded and reported.

3. They help insure accuracy and consistency of action based on policy.

4. They reduce the amount of time spent raising questions and getting directions about routine policy matters.

5. What the employe expects of his supervisor

Q. What do employes expect from the person who supervises them?

A. Supervisors are expected to:

- Give employes fair, friendly, and consistent treatment on job assignments, discipline, wage matters, time off, overtime, promotions, and transfers.
- Clearly establish what is expected from each employe.
- Recognize, utilize, and develop each employe's skills and knowledge.
- Keep promises and show confidence in the work group.
- Get results by leading—not by driving.
- Develop a give-and-take relationship in which ideas, complaints, and information are fully discussed.
- Tell employes how they are doing and provide recognition for accomplishment.
- Develop insight into individual personalities and problems.

Q. To what extent is leadership a quality that a supervisor can develop?

A. No one is born with all the qualifications necessary for leadership. These must be developed. The extent to which a person can develop his ability to lead depends on such factors as:

- How determined he is to become a leader.
- His willingness to accept responsibility and develop the ability to make decisions.
- How hard he tries to improve himself.

Q. How have the essential qualifications of a good supervisor changed in recent years?

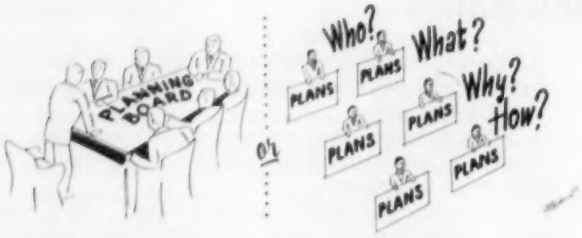
A. Today, a supervisor must be able to get results by managing people. He cannot depend on his technical know-how alone.

Furthermore, the running of his department is no longer a "one-man show." He must know how to utilize the services of staff specialists.

Finally, a supervisor faces more complex problems resulting from technological changes, organized employe opinion, new techniques and systems, and the need for planning and policy formulation.

More than ever, a supervisor must get results through people. In reality, he is a "manger of a business within a business."

6. Planning to meet management goals



Q. Why is planning important?

A. It's essential for:

- Coordinating the work of all departments of a company.
- Making the most effective use of management skill and time.
- Economically combining the manpower, machines, equipment, materials, and methods in every department.

Q. Who should make plans?

A. Everyone responsible for carrying out an operating function. This means top management, department heads, foremen, supervisors, and individual employes, as well. The more responsibility a person has, the more important planning becomes.

Q. What are the yardsticks by which planning should be measured?

A. Any plan should:

- Clearly state a definite course of action to be followed and goal to be achieved, with consideration for emergencies.
- Be realistic and practical.
- State what's to be done, when it's to be done, where, how, and by whom.
- Establish the most efficient sequence of operating steps so that more is accomplished in less time, with least effort, and with best quality results.
- Assure meeting deliveries without delays.
- Establish the standard by which performance is to be judged.

Q. What company planning is essential?

A. Over-all company planning is needed to forecast the volume of output required to meet customer demand. To maintain an organizational structure best suited for a company's operations. To procure an adequate supply of operating funds. To find the best sources of manpower and materials. And to undertake adequate research.

Q. What kinds of plans does effective supervision require?

A. Plans should cover such factors as:

Manpower—right number of properly trained men on the job.

Materials—adequate supply of the right materials and supplies.

Machines—full utilization of machines and equipment, with proper maintenance.

Methods—most efficient handling of operations.

Deliveries—making deliveries on time.

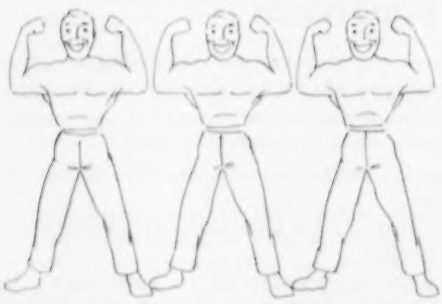
Tools—sufficient well-conditioned tools.

Layout—most effective use of space.

Reports—maintaining proper records and reports.

Supervision—planning work for employes and organizing supervisor's own time.

7. Morale—and how to help build it



Q. Why is high morale such an important factor in building an effective employe group?

A. Employes with high morale do more and better work. And each employe's basic drives must be satisfied, if his performance is to be effective.

Q. What conditions are conducive to the development of high morale?

A. Conditions such as the following:

- Supervision that shows insight into employe desires for self-development, recognition, status, opportunity for expression, and treatment as an individual.
- Safe and good working conditions.
- Satisfactory hours and wages.
- Job security and opportunity for advancement.
- Fair and consistent policies.

- Consultation with employes on matters affecting them.
- Interesting work which fully utilizes employe abilities.
- Employes who get along with one another.
- Employes who have confidence in their leadership and understand the part they play in the company's success.

Q. What signs reveal a condition of high or low morale?

A. Morale is low when:

- Turnover, absenteeism, tardiness, complaints, and accidents are high.
- Employes seem bored, "soldier" on the job, argue, give alibis, waste time, quit early, or do excessive talking.
- Spoilage and waste rise.

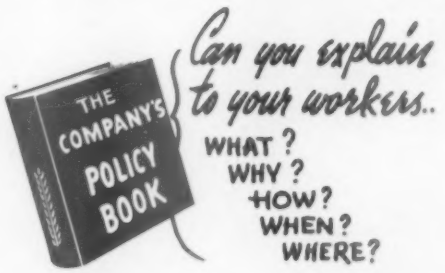
Morale is high when:

- Work is done in a quiet and orderly way.
- Employes "pull together" and show enthusiasm for their work.
- There's good-natured discussion among the employes and with their supervisor.
- Employes show a healthy interest in costs, quality, performance, and safety.

Q. How does a supervisor's way of correcting an employe affect morale?

A. A supervisor destroys morale by punishing and harshly criticizing every employe who makes a mistake. He builds morale when he takes the proper time to talk to the employe about his mistakes, offers constructive and specific help, and encourages better work.

8. Making the most of company policy



Q. What is meant by a company or departmental policy?

A. A policy is a rule or regulation established to guide the actions of management and employes so that their performance is in line with company objectives.

Q. Why are policies necessary?

A. For these reasons:

- To insure the consistent and uniform handling of problems and situations among all departments of a company.
- To provide a guide by which subordinates can make certain decisions without checking with their supervisors.
- To set standards for managerial action which will properly observe the rights and interests of the company, its public, customers, owners, management, and employes.
- To save supervisors' time and effort in handling and deciding questions and problems that recur often.
- To coordinate and control the operations of all departments so that they work together toward the same company goals and not at crosspurposes.
- To prevent making costly and snap decisions with every slight change in operating conditions.

Q. What are the basic types of policy?

A. Usual types of policy relate to: sales, finances, accounting, purchasing, production, personnel, research, labor, and public relations.

Q. With what types of policies are supervisors most concerned?

A. This depends on the nature of a supervisor's responsibilities. For example, a production supervisor would be primarily concerned with production, personnel, and labor policies. An accounting supervisor, primarily with accounting and personnel policies. Each supervisor, however, is responsible for carrying out the same type of functions as top management. Therefore, his actions must take into account all policies of the company, even though his primary concern is with certain types of policies.

Q. Why must policies be "tailor-made" to fit the individual needs of a company?

A. Companies vary in size, product, services, organization, location, and people. Policies, therefore, must reflect the course of action that is most effective for the particular conditions and factors involved.

9. Know the facts about employe morale

The conclusions of a recent research study again point to the fact that employe morale depends, to a large degree, on the type of relationship between a foreman and his employes.

Variety . . . Employes derive greater job satisfaction when they perform a variety of tasks. A foreman, therefore, may be able to set up a system of job rotation. Or, develop employes so they qualify for promotions to jobs of greater complexity. Or use his managerial ability and imagination to make even a routine job interesting.

Pressure . . . Too much pressure on a job causes employe morale to drop. A good foreman can relieve his employes of undue pressure by careful planning and scheduling, by telling his employes about changes in advance, and by considering the human factor in assigning work.

Respect . . . A foreman builds morale when he has a personal feeling for his employes, understands them, and trusts them. Also, when he sets the right example and talks about specific cases, rather than general principles, when faced with a problem.

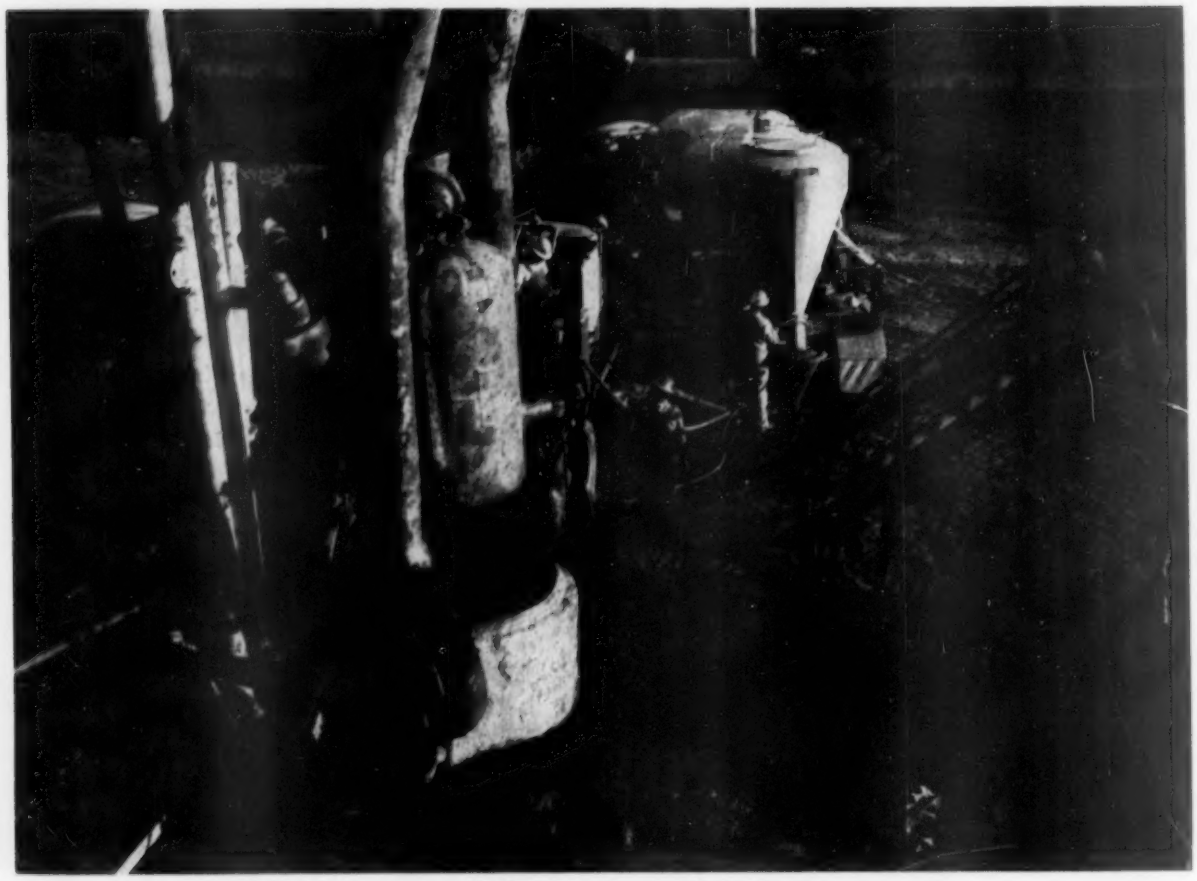


Fig. 1—Problems in cementing become much more critical as the casing size increases.

How to Cement Big Pipe

Try these suggestions to prevent those expensive failures

by William W. Ball

SETTING and cementing of large-diameter casing (8⅝ in. and larger) has received relatively little consideration in our modern oil-field activities where most attention has been directed to the completion of the well.

Setting the surface pipe has become a routine operation, with little thought given to the troubles that may develop if the job fails. The importance of good jobs on surface casing and protection strings cannot be overemphasized. Many failures have proved expensive and have prolonged the completion of the well. While it is true that the same problems exist in cementing both large and small-size pipe, it is surprising how much more critical some of these become when setting the larger sizes (Fig. 1).

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Expensive problems . . . The two most common failures are channel cement jobs (circulation around the surface pipe after the pipe has been cemented and drilling started), and pipe parting and going down the hole. The correction of a channel cement job often requires a plugback below the bottom of the casing, followed by a recement job. This involves much lost time and additional expense. When pipe is parted and goes down the hole, the repair job is even more difficult and expensive, and the value of the surface casing as a protection from blowout is decreased (Fig. 2).

Two common problems that arise during the cementing operation are pumping the pipe up and pumping the pipe in two. The first of these is a common occurrence when setting surface or conductor strings and usually can be overcome by the use of proper techniques. Pumping the pipe in two is much more serious, but it can be prevented by controlling the pressure so that it does not exceed the safe working strength of the pipe.

Channeling

Channeling inside the casing is an occurrence that is not recognized generally and can only be prevented by use of a bottom plug. It is caused by a combination of factors present on every job, which are: (1) the sudden reduction of velocity of the cement when it comes out of the 2-in. discharge into the larger o.d. casing; (2)

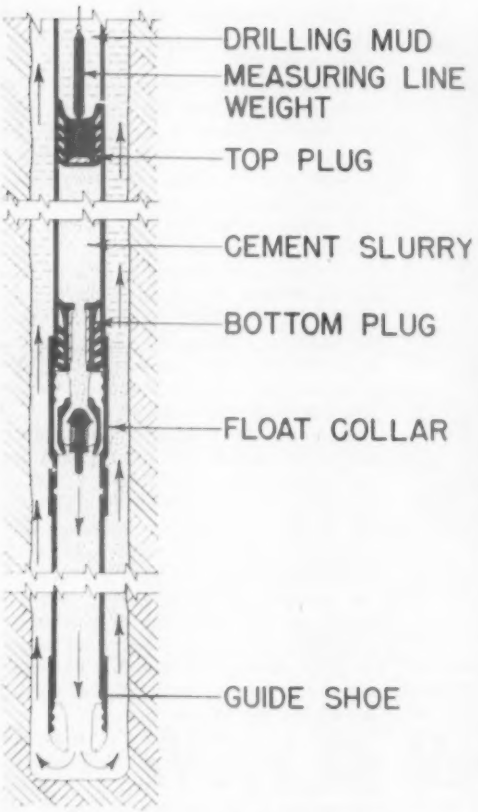

Fig. 2—Flow of cement for normal cementing operations.

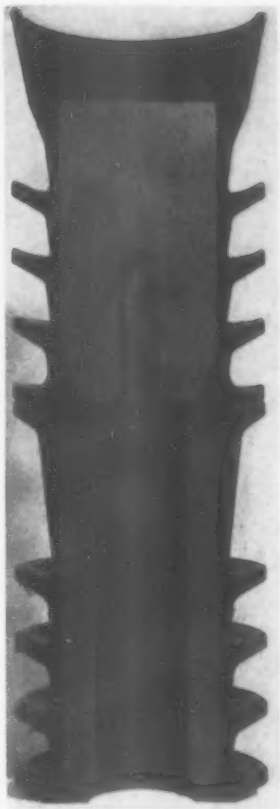

Fig. 3—Top and bottom plugs for proper two-plug cementing.

the cement falling inside the casing does not displace evenly, since it is heavier or denser than the fluid already in the casing; and (3) a wall cake forms inside the pipe when mud is used as a drilling fluid.

How to eliminate . . . These basic facts cannot be changed, but their resultant problems can be prevented by running one plug **ahead** of the cement, and another **behind** it.[1] The plug ahead of the cement (commonly called the wiper or bottom plug) serves to wipe the pipe clean and keep the drilling fluid in the pipe separated from the cement until the cement reaches bottom.[4] This plug is so constructed that when it reaches the float or shoe, a small amount of pressure is built up which ruptures a rubber diaphragm allowing the cement to pass through the center of the plug (Fig. 3).

Of course where the pipe is open ended, the plug is pumped out of the casing. More emphasis should be placed on the importance of using the wiper plug in cementing larger-size pipe. Had it been used generally in the past, operators and contractors would have been saved many thousands of dollars, as well as headaches and lost time. The top plug (run behind the cement) insures that the displacing fluid does not channel through the cement (Fig. 3).

The problem of channeling on the outside, in the space between the pipe and the bore of the hole, could be a continuation of the channeling inside the pipe or it could be caused by a partial bridging between the pipe and hole due to cuttings or cavings. In wells where mud is used as the drilling fluid, channeling is much more prevalent. This is caused by partial bridging due to mixing of mud and cement, producing a fluid of very high viscosity which is resistant to flow.

This fluid will tend to cease flowing and the thinner cement behind it will channel through. This condition can be helped by using a spacer of water or some other cleansing fluid ahead of the cement, the amount to be determined by the depth of the well and the size of the pipe and hole.[2] Here again the use of the bottom plug can be of great value because it keeps the cement in a clean, uncontaminated condition until it starts up around the outside of the pipe.

Having entered the annular space, the heavier and more viscous cement will not channel upward through the thin spacer fluid, but will displace it evenly. The only way to insure the fact that the cement slurry is evenly distributed around the casing is to use centralizers as shown by Howard and Clark.[2]

Parting of the Pipe

When setting surface and intermediate string, it is often impossible to locate the bottom of the casing in a hard formation. When this condition exists, the subsequent drilling action may jar the pipe and wash out around it. After this occurs, the bottom joints may work loose and fall down the hole. Sometimes this results in abandonment of the well. It has been found that this type of casing or cement failure can be greatly reduced by the use of wall-cleaning devices and centralizers placed on the bottom few joints of casing. These remove the mud filter cake, center the pipe, and improve the bond between the cement and the walls of the hole.[3]

Pumping the Pipe Up the Hole

This may occur when attempting to break circulation in preparation for the cement job. The usual cause is the accumulation of cuttings and cavings around the outside of the pipe. At this point in the operation, care must be exercised to prevent damage. If the pump is started too fast, and the annulus is bridged, the pipe may be raised from the hole by hydraulic action.

This force is sometimes great enough to lift the rig. For this reason, it is best to leave the pipe unchained and with the elevators attached to the pipe until after circulation has been established. It is always good practice to circulate and clean the hole as well as possible before removing the drill pipe. Another good practice is to stop and break circulation before reaching bottom with the casing. This practice removes the cuttings a little at a time rather than all at once, as occurs when pipe is run to bottom before breaking circulation. It also helps keep the pressure down and minimizes lost returns.

Calculating critical pressure . . . Let us assume we have a well with 10¾-in. casing to be set at 100 ft. in a 13⅜-in. hole. We should first calculate the critical pressure, or pressure required to lift the pipe from the hole. This can be done by dividing the total weight of the casing by its cross-sectional area. For example:

$$P = \frac{\text{Weight}}{\text{Cross-sectional area}}$$

$$= \frac{100 \times 32 \text{ lb.}}{(10.75/2)^2 \times 3.14} = 35.2 \text{ psi.}$$

O.d. of casing—10¾ in. Weight of cas-

Fig. 4—Top cementing plug. It insures that the displacing fluid does not channel through the cement.

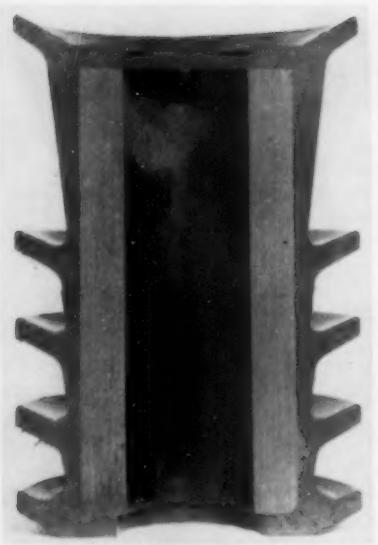

Fig. 5—Bottom cementing plug. It wipes the pipe clean and keeps the drilling fluid and cement separated.

ing—32 lb. per foot. Length of casing—100 ft. P = pressure required to lift 100 ft. of 10¾-in., 32-lb. pipe, neglecting all external forces and loss of weight due to immersion in fluid.

Here we see that the pipe will start coming out of the hole if the pressure rises above 35.2 psi. when we start pumping. It can be seen that care must be taken when the pump is started and again the only safe procedure is to leave the pipe unchained, leave the elevators attached to the pipe, and resume pumping, watching the pipe all the time. As the pipe rises, the pump should be slowed down. Ordinarily, after the pipe has risen a few feet, circulation will usually be established. Pump pressure can then be increased gradually to clean the hole, and the pipe should settle down again to its original position.

If the pipe will not go back down, it can be raised and lowered while pumping and, usually, can be worked into place. If this fails, the operator has three alternatives; he can either cement the pipe where it is; mix mud to stop the cavings and help lift them from the hole; or the pipe may be pulled and drill pipe and bit run in the hole to clean it. This last method is often unsuccessful unless mud is mixed to prevent the cavings. Another commonly used practice is to drill the small hole considerably deeper than the casing point to form a pocket into which the cavings can fall.

The pipe may be pumped up while displacing the cement if the differential hydrostatic pressure between the cement and the displacing fluid is great enough to overcome the weight of the pipe when applied to its cross-sectional area. If this calculated differential does not create too great a lifting force, the pipe may be chained down after good circulation has been established. For an example of this type job, let us consider using 20-in. o.d. pipe, weighing 90 lb. per foot, to be set at 200 ft., and displacing with water:

Pressure exerted by a column of water 1 in. deep = 0.433 psi.

Outside diameter of casing—20 in.

Weight of casing—90 lb. per foot.

Length of casing—200 ft.

Weight of cement—16 lb. per gal.

Weight of water—8.34 lb. per gal.

Hydrostatic pressure of 200 ft. of water = 0.433 × 200 ft. = 86.6 psi.

Hydrostatic pressure of 200 ft. of 16-lb. per gal. cement = 86.6 × 16/8.34 = 166.2 psi.

Differential pressure = 166.2 − 86.6 = 79.6 psi.

F = lifting force = 79.6 × $(20/2)^2$ × 3.14 = 24,994 lb.

Weight of pipe = 90 lb. × 200 ft. = 18,000 lb.

24,994 lb. − 18,000 lb. = 6,994 lb. which means that the pipe may be chained down with relative safety.

Cementing in stages . . . If the calculated lifting force (due to the difference in weight of the fluids) is excessive, then a heavier displacing fluid must be used or the density of the cement slurry may be lowered by the use of proper additives. In extreme cases involving very large-diameter pipe set at a considerable depth where the cost of a heavy displacing fluid is prohibitive, the pipe may be cemented in stages. This involves running a volume of cement that can be placed without creating a hazard, then perforating above the top of the cement and completing the job.

Some operators prefer to run a two-stage cementing tool for this type job. The tool is placed in the string at the desired depth and is opened and closed by the use of plugs. This eliminates the necessity for perforating and gives the added advantage of sealing the holes when the tool is closed. Another means of accomplishing additional fillup at shallow depths is called a "top outside job," which is accomplished by running a string of small-diameter pipe between the outside of the large pipe and the hole and placing the cement through the small pipe.

Pumping the pipe in two is another difficulty sometimes encountered in these operations, and is the result of applying too much pressure on the casing under various circumstances. One example of this is the attempt to break circulation when the pipe is stuck on the outside. Ordinarily, the pipe will pump up the hole, but if it is stuck too tight it may part. Another cause of pipe parting is attempting to break circulation when pipe is plugged on the inside, on top of the shoe.

Also, if too much fillup is attempted on the second stage, the differential pressure may be built up to a point where the lifting force will exceed the strength of the pipe, and again the pipe will part.

The purpose of this article is to direct attention to some of the problems existing in cementing large-diameter pipe which are often neglected, but which can result in additional costs and trouble. It is hoped that these difficulties can be eliminated in the future by applying preventive or corrective measures.

Acknowledgment

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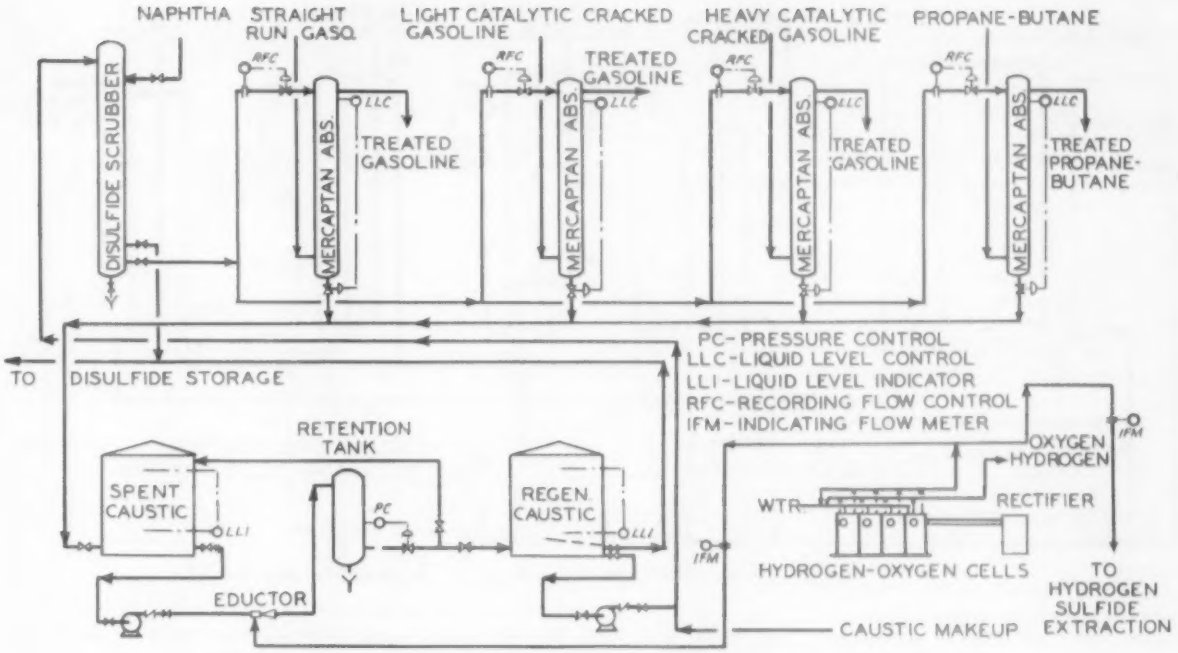

SCHEMATIC FLOW SHEET of mercaptan extraction and caustic soda regeneration unit. Fig. 1.

Two Ways to Reduce Stream Pollution

1. By the electric mercaptan process

2. By amine-salt hydrogen sulfide process

by Oliver J. Zandona* and Charles W. Rippie†

REGENERATION of spent caustics can be accomplished by use of external atomic-oxygen oxidation utilizing the Rippie electric process. The amine salt-H_2S process can be used to extract hydrogen sulfide from hydrocarbon streams.

The use of these processes will reduce substantially the chemical pollution of streams experienced by many refiners. Both plant operators and management will find these processes simple and economical solutions to the chemical treatment problem.

Sodium mercaptide regeneration equipment . . . The electric-process equipment consists of a commercial electrolyzer for the generation of oxygen and hydrogen, an eductor for the injection and mixing of atomic oxygen, a retention tank utilized to maintain residence time, pumps, and necessary piping and instrumentation.

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Paper presented at regional meeting, W.P.R.A., Casper, Wyo., September 23, 1954.

A new installation being constructed by Ashland Oil & Refining Co. will employ the chemico cell which is a unipolar or tank-type cell operating at high amperage up to 10,000 amp. The cell tank contains eight anodes and cathodes constructed of Armco iron nickel plated.

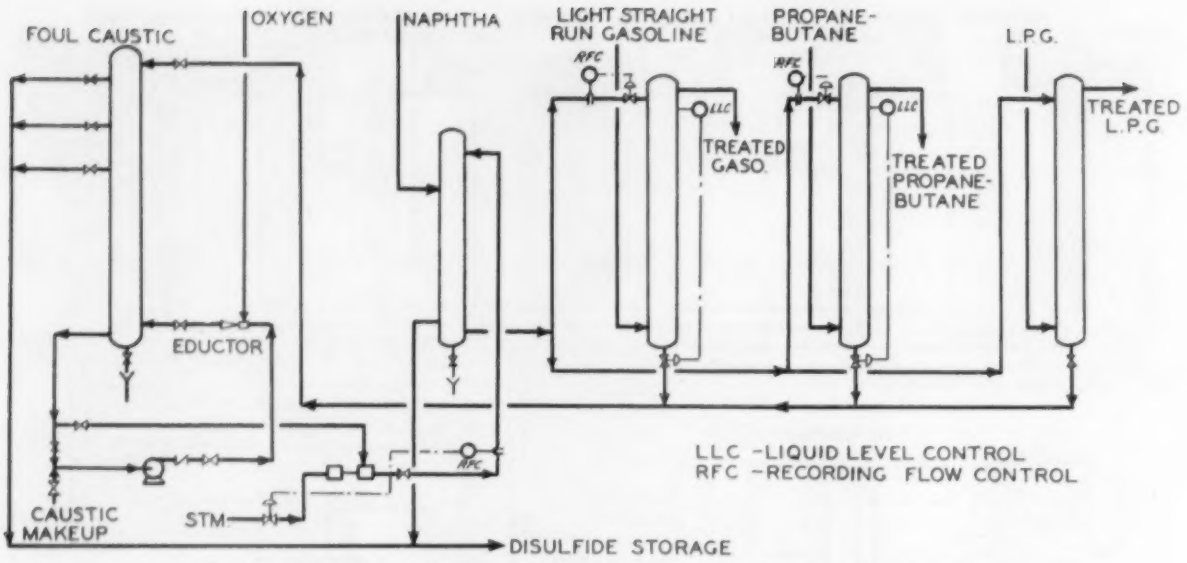
Each plate is separated by an asbestos diaphragm. Oxygen collectors are mounted above the anode plates while hydrogen collectors are mounted above the cathode plates. Electrical energy is supplied by a General Electric selenium rectifier. The complete oxygen-generating equipment is housed in a pressurized building to eliminate hazards of nonexplosionproof equipment in the process area.

The flow diagram of the electric mercaptan process, Fig. 1, indicates the flow of caustic-soda solution in the regeneration section, and sour gasoline in the extraction section.

The size of oxygen generating equipment is dependent upon sulfur load contained within the circulating caustic solution or the extraction efficiency of the treating section. Utilizing the chemico cell efficiency of 90 per cent, it is expected that 0.5 to 0.7 per cent of mercaptan sulfur per kilowatt will be oxidized with the unit described.

Process flow . . . Referring to Fig. 1, spent caustic from the absorbers is charged into the spent caustic tank which is utilized as a charge tank for the regenerator. Spent caustic is pumped into an eductor which is located within close proximity of the cell in order to minimize time lapse for the atomic oxygen generated to mix with spent caustic soda.

The atomic oxygen catalyses and reacts in the oxidation of mercaptan sulfur-bearing caustic solution to form the disulfides later removed. The effluent of the eductor is charged into a retention tank where contact time is main-



SCHEMATIC FLOW for hydrogen sulfide extraction and caustic soda regeneration unit. Fig. 2.

tained under pressure to afford further oxidation reaction. The effluent of the retention tank passes to the regenerated tank where disulfides are separated by gravity and periodically removed.

The regenerated caustic solution is then passed through a naphtha wash to remove last traces of disulfides. The regenerated caustic solution leaving the naphtha scrubber is reused for mercaptan extraction from the sour gasoline.

Operating Data

Electric mercaptan process using external oxidation of mercaptides has operated at the Ashland Oil & Refining Co. No. 1 plant. More than one-half million barrels of gasoline have been treated with the same caustic-soda solution with satisfactory results. A typical plant total-sulfur balance is indicated in Table 1. All electrometric titrations for mercaptan sulfur and sulfide sulfur used Shell's methods 177/51 in gasoline and 304/49G in aqueous solutions respectively.

The amounts of acid oils and sulfur derivatives of these compounds increased with the development of catalytic cracking operations. The existent gum dish test A.S.T.M. D381-52T (glass dish) determines the amount of nonvolatile residue in the time of the test.

The removal of the acid oils by caustic washing has been found to reduce glass-dish gums to satisfactory low values. As a result, treatment of catalytic cracked gasoline consumes large amounts of caustic soda. Caustic-soda solutions of high acid oils content increase plant disposal problems. Flue-gas neutralization has been developed over the industry, but it is not considered a complete solution.

TABLE 1—MERCAPTAN EXTRACTION AND CAUSTIC REGENERATION OPERATING DATA

Material—	Straightrun gasoline	Thermal cracked gasoline	Caustic solution
Flows, bbl. per day	3,500	4,500	1,600
Gravity	67.0° A.P.I.	56.7° A.P.I.	20.0 B.
R.v.p., psig.	8.1	6.5	
Distillation:			
Initial, °F.	1,101	106	
End point, °F.	310	380	
Mercaptan sulfur, weight per cent:			
Sour	0.012	0.007	
Treated	0.009	0.004	
Spent			0.132
Regenerated			0.120
Sulfide sulfur, weight per cent:			
Sour	0.008	0.0	
Treated	0.0	0.0	
Spent			0.073
Regenerated			0.061
Extraction and regeneration:			
RSH, lb. per day	30.0	50.0	77.0
H_2S, lb. per day	80.0	0.0	77.0
Power:			
Cell, kilowatts per day			528

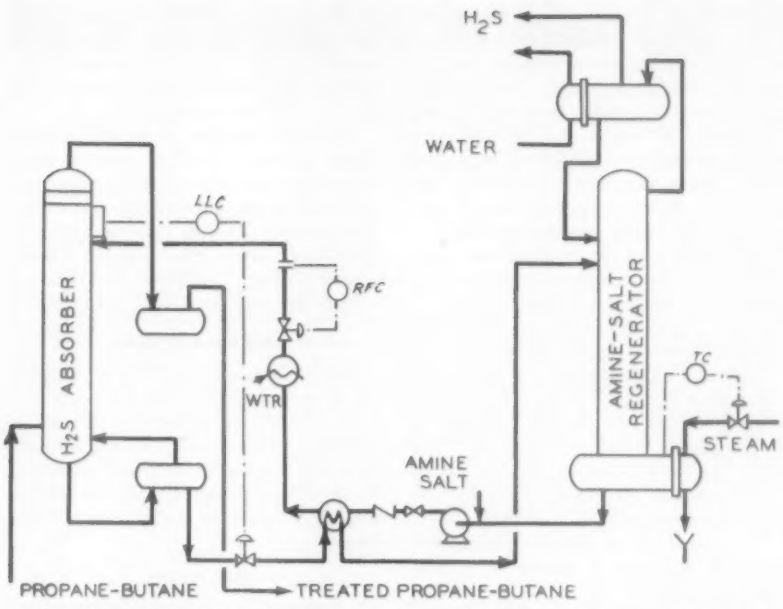
Leonard installation . . . Recently Leonard Refineries, Inc., of Alma, Mich., installed the electric process to oxidize mercaptan sulfur compounds in spent caustic-soda solution to disulfide sulfur compounds. This refinery reduced caustic consumption at least 75 per cent, stopped caustic disposal from T.C.C. treating operations, reduced inhibitor requirement, improved glass-dish gum, and left the cresols in the treated gasoline.

The extraction of thiophenols is believed to be contributing to the reduction of glass-dish gum from 6 mg. per 100 ml. before treatment to less than 2 mg. per 100 ml. after treatment without the use of inhibitor.

Recently Cabal[10] reported that high glass-dish gums may be related to manifold deposits in automotive engines. This excellent paper on gasoline stability did not state that the added cresols in glass-dish tests were free of thiocresols. However, it is pointed out that antioxidant sweetening of gasoline may tend to form peroxides and to increase manifold deposits under some conditions. The over-all plant balance is indicated in Table 2.

Hydrogen Sulfide Extraction

Caustic-soda solution is usually employed to extract small concentrations of hydrogen sulfide from liquid hydrocarbon products. A few of the methods for the disposal of foul caustics include lagooning, neutralization with spent acids or flue gas, and oxidation with air and steam.[3,4,5] None of these



TREATING PROPANE AND BUTANE by hydrogenation sulfide amine salt process. Fig. 3.

methods present[5] a means for reuse of the caustic through its regeneration.

The regeneration of foul caustics through external oxidation has been successfully accomplished by the Ashland Oil & Refining Co. Caustics containing sodium acid sulfide or sodium sulfide treated with atomic oxygen will regenerate to free caustics and sulfur complex. Small amounts of mercaptan sulfur within the system are converted to the disulfides which absorb or react with free sulfur to form polysulfides.

The oxygen-generating equipment for foul-caustic regeneration is identical to the unit described for the regeneration of mercaptan sulfur. Normally a common charge effluent drum is employed along with an eductor pump and necessary piping and instrumentation.

TABLE 2 — MERCAPTAN EXTRACTION AND CAUSTIC REGENERATION OPERATING DATA

Material—	T.C.C. gasoline	Caustic solution
Flow, bbl. per day	2,000	580
Gravity	51.8° A.P.I.	17.0° B.
Acid oils, per cent volume		27.0
R.v.p., psig	9.5	
Distillation:		
Initial, °F.	110	
End point, °F.	424	
Existent gum, mg. per 100 ml.:		
Sour	6.0	
Treated	2.0	
Mercaptan sulfur, weight per cent:		
Sour	0.0176	0.124
Treated	0.0036	0.100
Per cent reduction	80.0	24.0
Extraction and regeneration:		
Mercaptan sulfur, lb. per day	55.1	54.0
Power:		
Cell, kilowatts per day		360

Process flow . . . The flow of caustic in the hydrogen sulfide extraction unit is shown in Fig. 2. Conventional packed towers are employed for extraction of hydrogen sulfide from the hydrocarbon streams. The flow of caustic soda from the extraction tower is charged into a common regenerator charge effluent drum.

The recirculation of caustic soda acts as a vehicle for atomic oxygen addition. Thorough mixing in the process is accomplished at the eductor, and the distribution within the foul-caustic tank. The regenerated caustic is reused for extraction of hydrogen sulfides following washing in a naphtha solution to remove last traces of polysulfides.

Operating data . . . The regeneration of foul caustic in a blockout operation was tried to determine the regeneration of concentrated sodium acid sulfide solution. One hundred and forty barrels of spent caustic were pumped into the regeneration unit and circulated. The results of the test indicated that sodium sulfide was converted to sodium hydroxide. Sufficient mercaptans were present so that it is believed the free sulfur formed reacted with the disulfides to yield polysulfides. No evidence of colloidal or free sulfur was noted.

The test results are indicated in Table 3, after 48 hours of operation. All electrometric analyses were made with the Shell method 275/51 for alkalinity for free NaOH solutions.

Mechanism on oxidation reactions . . . The mechanism of oxidation reactions for the mercaptides and sulfides depend upon the presence of atomic oxygen in abundance with its equilibrium of various isotopes.[6,7] It is recognized that many electrochemical books[8] report that external electrolytic oxygen is molecular oxygen.

However, investigations reveal that the time factor was never measured. The electric process incorporates in its design the use of atomic oxygen to oxidize sulfides. Molecular oxygen in air or in oxygen cylinders converts sulfide sulfur to sodium thiosulfate and sodium sulfate very slowly, even at elevated temperatures and long contact time.[9] No free caustic is recovered.

Reactions for the electric process are:

$$2NaSR + H_2O + O = R_2S_2 + 2NaOH$$

$$Na_2S + H_2O + O = 2NaOH + S$$

$$R_2S_2 + S = R_2S_3$$

Operating costs . . . The unit operating costs for the regeneration of spent caustic-soda solutions are low. Normally, with automatic controls, operating attention of one-third man-days is adequate. Utility costs are those affected by electrical consumption of the rectifier, pumps, and unit lighting.

Justification for Plant Installation

The justification for the installation of complete caustic-soda-regeneration

TABLE 3—SODIUM SULFIDE REGENERATIVE TEST DATA

Material—	Spent caustic	Regenerated caustic	Net change
Capacity, bbl.	140.0	140.0	
Analyses, mole per liter:			
Sulfide sulfur	0.750	0.320	
Mercaptan sulfur	0.125	0.062	
Free NaOH	0.981	1.454	
Results:			
Free NaOH increase, lb.			980.0
Sulfur decrease, lb.			774.0
Power:			
Kilowatts	960.0		

and sulfur-extraction facilities may be based on the following items:

1. Increase in gasoline TEL susceptibility.
2. Decrease in caustic consumption.
3. Decrease in inhibitor requirements.
4. Low operating costs.
5. Decrease of waste-disposal problems.
6. Negligible corrosion experienced with low-temperature operations.
7. High on stream time.
8. Consistant quality products.
9. Decrease glass-dish gum for catalytic cracked gasoline.

A complete story of each individual refinery problem, keeping in mind the above items, will result in obtaining a rapid payout period for a unit installation.

Amine Salt-H_2S Process

The increased sulfur content of processed crude oils and natural gases increases the need for chemical treatment to remove hydrogen sulfide. Since the early days of its development, the advantages and the disadvantages of the amine process have been well known in the refining industry.[10 11 12 13 14 15 16] However, corrosion and chemical consumption constitute the major operation costs of the amine process.[17]

Limited amounts of technical data are available at this time on the new amine salt-H_2S process,[18] designed to improve the well-known amine process. The advantages of the new process are:

1. Reduced corrosion of regeneration equipment.
2. Reduced solubility of the solvent in the liquid hydrocarbon treated, without the sacrifice of hydrogen sulfide absorption capacity.

Controlled laboratory tests show that the amine salt had only 10 per cent of the corrosion rate compared to similar diethanolamine solutions. Carbon steel strips were exposed to salt and diethanolamine solutions under a reflux of a 24-hour period. Results of the test are indicated in Table 4.

The importance of elementary-sulfur recovery from hydrogen sulfide extraction processes has made extensive use of the amine regenerative process. The large makeup requirement of chemicals in the amine-salt process constitute appreciable expense.[16] It is reported that amine solutions have various solubilities in light and heavy liquid hydrocarbons.

Some commercial amine plants lose 20 to 40 lb. of amines per 1,000 bbl. of liquid hydrocarbon treated. Salt solutions are considerably less soluble than amines in poly feed stocks and gasolines. Although the present unit price of amine-salt solution is higher than amines, the reduced solubility and corrosion should give a favorable payout for the amine salt-H_2S process.

It is planned to operate the new process shortly to remove hydrogen sulfide from liquid poly feed stocks.

The operating cycle of the amine salt-H_2S process is shown in Fig. 3. Countercurrent extraction is employed utilizing a packed column. The regeneration of the amine-salt solution is accomplished by steam stripping. This new process can easily operate ahead of the electric mercaptan plant to provide low-cost over-all treatment.

A comparison of the diethanolamine and salt solutions is shown on a unit basis as follows:

	DEA	Salt solution
Corrosion, mg. loss	1.00	0.10
Solubility, wt.	1.00	0.10
H_2S capacity, grams per gallon	1.00	1.00
Boiling point, °F.	216	222
Unit chemical cost	1.0	2.0

Conclusion

The advent of the development of the electric mercaptan process, the electric hydrogen sulfide process, and the amine salt-H_2S process will afford the refiner new tools to obtain low-cost desulfurization and to combat stream pollution.

The extraction of mercaptan sulfur from gasoline yields many benefits of improved odor, storage stability, response to TEL for octane improvement, and inhibitor for stability. Caustic soda is used for the extraction of acid oils from catalytic cracked gasoline to reduce glass-dish gums. The consumption of caustic soda results in a problem of spent chemical disposal.

The use of the electric mercaptan process has resulted in selective extraction of the thiophenols resulting in low glass-dish gum and subsequent elimination of the disposal problem. The oxidation of mercaptides to disulfides in caustic-soda solutions by means of atomic oxygen affords an economic process easily evaluated for quick payout.

Caustic soda used for the removal of H_2S from hydrocarbons may be reused after the conversion of the sodium sulfide to free caustic. The use of the electric H_2S process will eliminate the problem of foul-caustic disposal.

The disadvantages of the well-known amine process for H_2S removal have been high chemical consumption and corrosion. Laboratory evaluation of the new amine salt-H_2S process indicates advantages over the present known process through low liquid-hydrocarbon solubilities and decreased corrosion.

TABLE 4—CORROSION TEST: SALT SOLUTION AND DIETHANOLAMINE

Material—	Concentration (per cent vol.)	Boiling point (°F.)	Time (hours)	Loss of weight (mg.)	Condition of coupon
Amine salt	30	222	24	0.7	Tarnished by reflux
Diethanolamine	20	216	24	10.0	Pitted at liquid level

Acknowledgment

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New Wrinkles in Hot-Oil Washing

Fourteen Wilmington multizone wells respond to treatment which varied in three particulars from usual field practice

by J. P. Garten

SUBSTANTIAL economic returns from a hot-oil-wash production-stimulation program have resulted recently in Wilmington oil field by Royalty Service Corp. A total of 14 multiple-zone-completed wells (Tar, Ranger, Terminal, Fault Blocks 1 and 2) located within the Los Angeles city limits of the field, were washed. Although some of the wells did not show large gains, the excellent gains noted on other wells made the wash program markedly successful.

The method used to wash the wells varied slightly from the typical Wilmington well wash. The following table presents a comparison of the hot-oil method with the normal wash method being used in this field.

Royalty Service Hot-Oil Wash	Typical Wilmington Cold-Oil Wash
1. Kill well with dead oil.	1. Kill well with dead oil.
2. Run perforation knives to lowest depth in line selected for washing.	2. Run 2-ft. span wash tool on tubing. Tested all sands to be washed (at 2-ft. intervals, avoiding shale bodies) with the highest pump pressure that can be developed without stalling pump.
3. Run 6-in. span wash tool and wash selected intervals, avoiding shales, applying the following conditions: (a) 400 to 600-psig. pump pressure. (b) Use of stock-tank oil of comparable gravity, as well is producing, heated to 200° F. (c) Attempt to maintain full circulation. (d) Reciprocate tubing through a one-joint length stroke, at about 10 s.p.m.	3. Run 6-in. span wash tool and wash selected intervals, avoiding shales, applying the following conditions: (a) 400 to 600-psig. pump pressure. (b) Use of cold oil that is 7° or 8° A.P.I. gravity higher than oil being produced by well. (c) Attempt to maintain full circulation. (d) Reciprocate tubing through a one-joint length stroke, at about 10 s.p.m.
4. Return well to production.	4. Return well to production.

Differences . . . It is seen that there are three major differences in the washing method used by Royalty Service, and the usual Wilmington method. They are: (1) the use of perforation knives to assure that the perforations are open to fluid circulation, (2) the use of hot-oil to reduce the viscosity of the washing fluid and thus aid in fluid penetration, (3) the omission of the 2-ft. span wash.

The use of the knives is to insure the opening of all perforations; and the use of hot-oil is to allow deeper washing into the zone and to possibly dissolve some asphaltic materials. The operator believes these practices offset the Wilmington method of using the 2-ft. span perforation test to break down the plugging in the perforations before washing. It should be noted that this also saves the cost of a round trip with the tubing to change the span on the washing tool. A considerable savings results even with allowance for the rental cost of the perforation knifing tool.

Wash tool used . . . Fig. 4 shows the washing tool used for these washers in washing position in a prepack, liner well. The tool is similar to the typical cementing squeeze tool. In washing operations the wash fluid leaves the tool from the ports, located between the two opposed cups, and passes through the liner perforations. From here it circulates through the gravel eroding and picking up the plugging material, then passes back through the liner perforations above the tool and circulates out of the well.

In case the tool hits a sand bridge during washing, the tubing can be rotated. Then, the belly springs restrict the tool movement, and the tool is opened for straight-ahead circulation to break down the sand bridge. Circulation can be reversed with the tool in this position to wash the loose sand up the tubing. Because of the high pres-

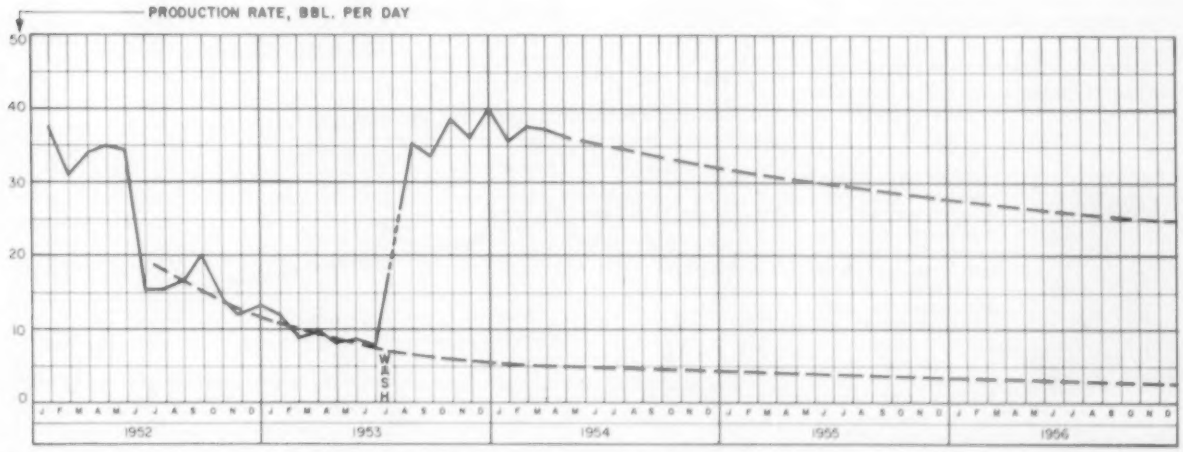


Fig. 1—Production history of the B-3 Nelson. Principal reason for success is that during prewash history, well exhibited substantial productivity.

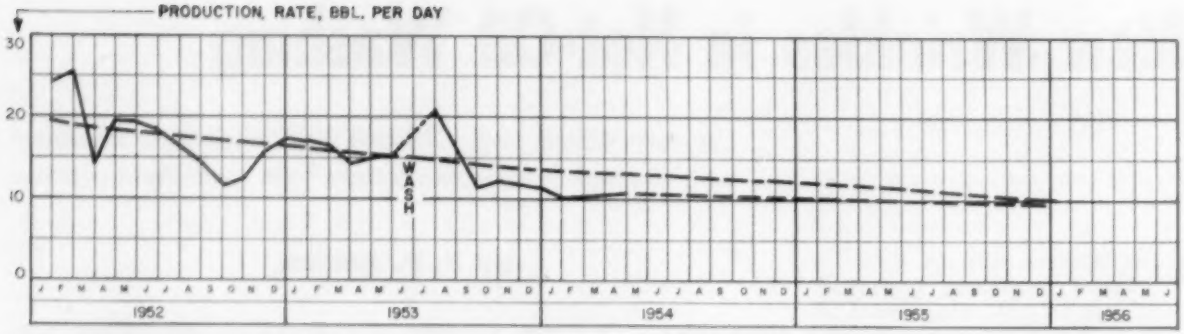


Fig. 2—Production history of the 1 P.E. Well had been producing at a very gentle decline rate, and appears to have suffered production loss.

sures involved during the reciprocating action, while washing, the neoprene cups that give the best service are special California style extra-heavy-duty packer cups.

Selection of wells . . . The almost complete lack of pressure (hence P.I. information) severely limited the method used for selecing wells for washing that could be based on any pressure parameters describing the loss of productivity. The method actually used was not based on any other concept than choosing wells that were low producers. Past production performances had little or no influence on selection. This is shown very clearly by reference to the production curve for the 23-7-1 Gilmore (Fig. 3) which was washed during a gentle production-rate decline after a successful hot-oil wash. (This was one of the original wells in which Royalty Service tested their method, but is not included in this 14-well wash program.)

Individual well benefit . . . Because of the wide range of completion dates and prewash production conditions (Table 2), little or no correlation can be made. However, in nearly all cases where the prewash production rate was below 15 bbl. per day, the wash was an economic success. At the time of this wash program, the preceding was not known.

Other operators in the field with substantial pressure and P.I. histories

TABLE 1—ECONOMIC ANALYSIS ROYALTY SERVICE CORP. HOT-OIL-WASH PROGRAM

Well—	Gross prod. inc. (bbl.)	Gross value of prod. inc.*	Cost of wash	Net profit from wash
16-7-2 Ashbridge	2,315	$4,630	$868	$3,762
1 Buckley			1,811	—1,811
23-7-1 Gilmore			1,139	—1,139
15-7-2 Hall	492	994	674	320
A-1 Nelson	8,980	17,960	1,390	16,570
B-3 Nelson	25,100	50,200	1,137	‡49,063
B-6 Nelson	19,000	38,000	1,010	‡36,990
25-8-1 Patton	2,340	4,680	840	3,840
20-8-1 Packard	795	1,590	841	749
2-8-2 Packard	1,012	2,024	841	1,183
1 P.E.	1,243	†—2,486	932	†—3,418
A-3 Santa Fe	2,430	4,860	1,050	3,810
B-4 Santa Fe	2,590	5,180	1,167	4,013
22-7-1 Wright	7,650	15,300	1,422	13,878
Total	73,947	$142,932	$15,122	$127,810
Investment return		$127,810/$15,122 = $8.45		

*Based on $2 per bbl. oil. †Production loss on this well. ‡Increase measured only to end of year 1955, net gain for these wells will be greater than listed in this table.

TABLE 2—BASIC WASH DATA

Well—	Date— Completion	Date— Wash	Prewash prod. rate (bbl./day)	Wash tool	30-day postwash rate (bbl./day)
16-7-2 Ashbridge	3/53	3/54	28.0	Atlas	36
1 Buckley	3/40	10/53	19.5	Atlas	19.3
23-7-1 Gilmore*	6/43	4/53	16.2	Atlas	16.8
15-7-2 Hall	10/45	12/53	8.7	Atlas	12.7
A-1 Nelson	5/42	1/53	52.0	Atlas	58.7
B-3 Nelson	6/40	7/53	7.7	Atlas	35.6
B-6 Nelson	12/41	7/53	1.7	Atlas	43.1
25-8-1 Patton	2/40	11/53	9.6	Atlas	
20-8-1 Packard	6/40	2/54	19.7	Atlas	29.4
2-8-2 Packard	11/42	2/54	15.4	Atlas	24.9
1 P.E.†	4/49	7/53	15.2	Atlas	20.9
A-4 Santa Fe	5/40	2/53	18.8	Atlas	1,166.34
22-7-1 Wright	5/42	1/53	16.5	Atlas	1,921.61

*Second wash. †Third wash.

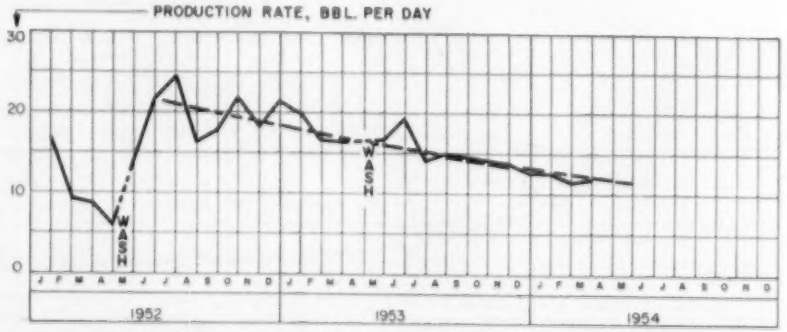


Fig. 3—Production history of the 23-7-1 Gilmore. The lack of pressure severely limited the method used for selecting wells for washing.

THE AUTHOR

James P. Garten, reservoir engineer for Long Beach Oil Development Co., received his B.Sc. degree in petroleum engineering from University of California in 1951, and at the present time has completed all requirements but thesis for his M.Sc. degree at the University of Southern California. During the year 1954 he has been chairman of the Junior Group of the A.I.M.E., Pacific Petroleum Chapter.

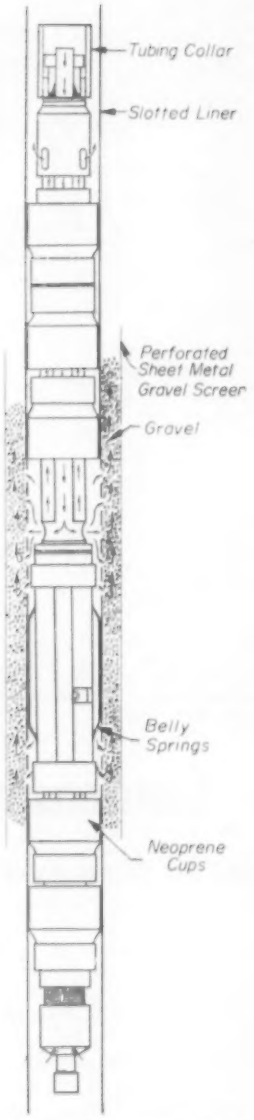


Fig. 4—The wash tool in position in a well with prepack liner.

for most wells do not rely on so loose a correlation to predict washing success. The substantial success of this wash program, in relation to the random method of well selection, is a direct gage of the apparent large benefits available from this washing method.

The individual benefits that were derived from this washing program can best be presented in a concise form by considering three wells that were representative of the three prewash production conditions that existed. They are dealt with individually in the following discussion.

Recently Plugged Wells With Evidence of High Productivity

The B-3 Nelson had the best wash results in the program and is representative of wells with high productivity that have suffered recent prewash liner plugging. Even a casual inspection of its postwash production-rate curve shows the conservativeness of the 1955 limit on the estimate of production increase resultant of washing.

The principal reason for success on this well is also shown on the production curve (Fig. 1), and is that during recent prewash production history the well exhibited a substantial productivity level (January to May 1952). That level is an indication that if the prepack liner had not plugged, as it did, the well could have maintained a healthy production rate.

Wells Exhibiting Normal Decline With Small Evidence of Greater Productivity

The well 1 P.E., as Fig. 2 shows, had been producing at a very gentle decline rate for this depletion-drive pool; and it appears to have suffered a production loss because of its hot-oil-wash job. A small production loss or no response is the typical behavior for this type of well. The reason for the production loss in this well was that during the washing process it is probable that some of the interbedded, incompetent shales were washed which caused additional plugging.

The prewash production conditions, as shown on Fig. 2, were such that there is little evidence of liner plugging; so the washing action in the portion of the liner opposite thick producing sands was not able to offset the probable shale-damage effects.

Wells Washed Too Soon After Production-Stimulation Efforts

The 23-7-1 Gilmore was the test well for this method and Fig. 3 shows that it received a very good wash in 1952. However, during the wash program being discussed, it was washed again. It can easily be seen that the well had not declined enough in productivity since the last wash (a 10-month interval) to have merited rewashing. The response from this well was typical of wells that had been washed too soon after a previous effort.

Method of Evaluation

The process of determination of success or failure for this washing method was: (1) determining cumulative production over and above that expected without washing and converting this to a gross profit, and, (2) subtracting the direct production cost of the wash job from the gross profit, thus obtaining a final answer for a net profit per wash job. This method is presented in tabular form in Table 1.

The production increases due to washing were measured on the production-rate curves by planimetering the area enclosed by the extended prewash production-rate curve and the postwash production-rate curves (area = increased production). In no instance was the increased production, due to washing, considered beyond the end of 1955 because the possibility of future unknown production troubles beyond this date might mask possible gains, and also only two wells gave indication that they would have any appreciable gains beyond this date.

Results of washing . . . The results of this washing program, as presented in Table 1, indicate that the benefits will be substantial. The economic return of $8.45 for each dollar expended is sound proof that this effort at production stimulation has been successful.

Table 1 shows 11 of the 14 wells were washed for a profit that ranged from $320 to $49,000. The range of losses for the three wells that were washed at a loss was from $1,139 to $3,418. The net profit for the entire wash program was $127,810, a substantial return for $15,122 invested.

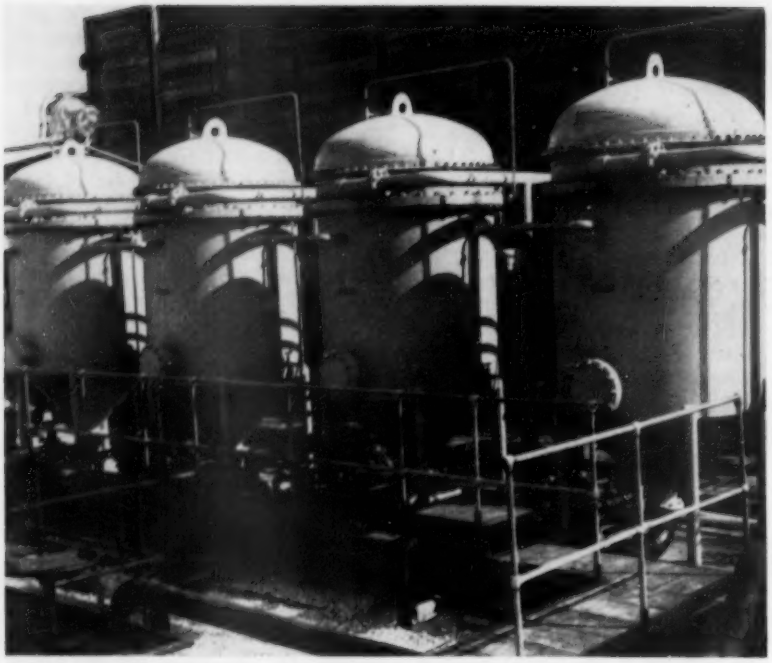
BOOKS

GEOLOGICAL STRUCTURE MAP OF RATON BASIN IN NEW MEXICO AND COLORADO. Austin Map Co., 415 Bewley Building, Fort Worth. One sheet. Price, $15 (paper copy) or $25 (cloth copy.)

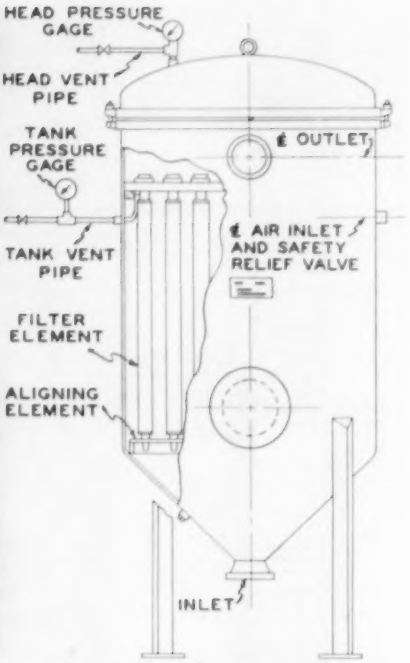
The Raton basin of southern Colorado and northern New Mexico is becoming more important in petroleum circles. This subsurface map of this area and also parts of northeastern New Mexico is on a scale of 1 in. equals 4 miles and the map covers an area 160 miles wide by 232 miles long. Northern portion of the map is contoured on the Dakota sandstone with a contour interval of 500 ft. The southern portion is mapped on the top of the San Andres (Permian) formation using the same contour interval. The major structural trends are very clearly shown and were obtained from the tectonic map of Colorado and New Mexico as published by the American Association of Petroleum Geologists. All wildcats are shown with pertinent geological information.

HANDBOOK OF CRETACEOUS FORAMINIFERA OF TEXAS. By Donald L. Frizzell. Published by the Bureau of Economic Geology, University of Texas, University Station, Box 8022, Austin, 232 pp., paper covers $1.75; cloth binding $2.75.

This comprehensive study is perhaps primarily of interest to advanced college-level students and commercial laboratory micropaleontologists, but should also be useful to specialists. The text contains discussion of the stratigraphy of foraminiferal faunas of the Texas Cretaceous including lists of fossils found in various groups and formations. It gives in tabular form an analysis of faunas by families, genera, and species. Correlation charts for Comanche and Gulf (Upper and Lower Cretaceous) and for Woodbine and Eagle Ford groups are two of the text figures. Twenty-one plates made from line drawings of the foraminifera are part of the handbook.



THESE FOUR FILTERS enable the recovery of 740 g.p.m. of makeup water from the oily condensate flow system at the Cities Service butadiene plant.



VERTICAL FILTERS used. Each has 54 elements suspended from a horizontal plate near the top of the filter. Fig. 1.

Cities Service Recovers 740 G.p.m. Condensate

. . . as result of modifications to flow system

by F. Lawrence Resen
Gulf Coast District Editor

MODIFICATIONS to the oily-condensate flow system at the government-owned butadiene plant operated for the Government by Cities Service Refining Corp. at Lake Charles, La., resulted in a considerable reduction of oil content of the condensate, allowing it to be reused as plant process water.

Prior to improvements, the condensate contained from 2,000-5,000 p.p.m. oil and the entire stream was lost so far as plant use was concerned. An initial change, involving installation of a holdup drum removed the greater portion of oil contained in the condensate, dropping it to about 180 p.p.m. Installation of a new-type pressure filter further dropped the oil content to 0-1 p.p.m.

Under present conditions and on a full-production basis an average of 740 g.p.m. of condensate may now be recovered and directed to cooling tower for further plant-process use.

Operating background . . . The Lake Charles butadiene plant is located adjacent to the company's refinery from which it receives a feed stock of butane - butylenes. After purification of this stream, n-butylenes are charged to catalytic dehydrogenation reactors, where in the presence of a large volume of superheated steam, the n-butylenes are dehydrogenated to butadiene.

Normally, some 372,000 lb. per hour of steam is superheated to 1,300° F. This is mixed with n-butylenes at 900° F. to hold a reactor temperature of about 1,175°. (All of this reactor steam is obtained from the 400-psig. boiler output.)

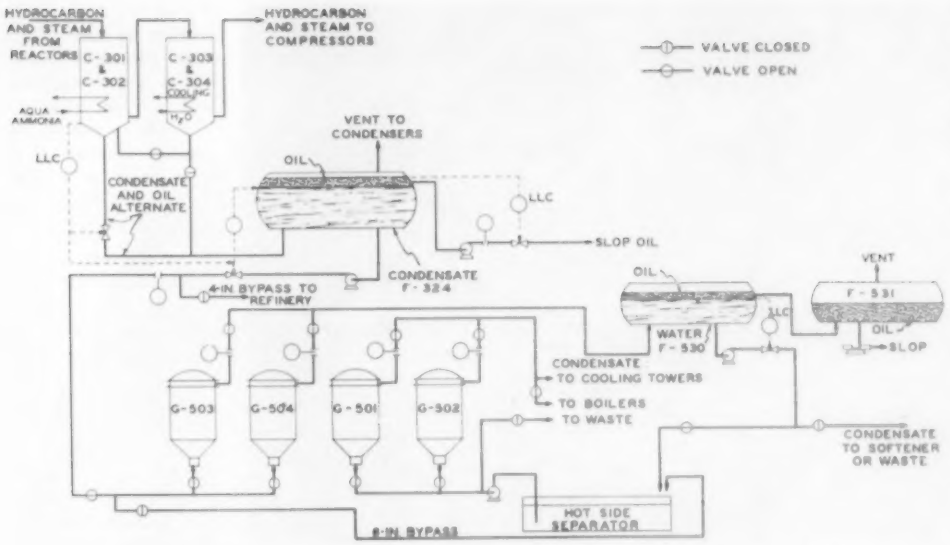
All of the reactor effluent, including steam and hydrocarbons, passes from the catalyst bed into the shell side of the waste-heat boiler tube bundles where the stream is cooled to 500° F. by water flowing through the tubes. (The "waste heat" obtained here is used to generate 170,000 lb. per hour of 200-psig. steam used in plant process.)

From waste-heat boiler bundles, reactor effluent in charged to the stripper-scrubber, where it comes in contact with a rich-oil stream. The reactor stream is cooled from 500° to 220° F.; the rich oil is stripped to lean oil, and is heated from 125° to 360° F.

From here the reactor effluent stream makes a pass through the ammonia reboilers and is cooled from 220° to 210° F. A final exchange with cooling water in a condenser drops the temperature to 100° F. When the stream is cooled below 220° F., the steam begins to condense. About 740 g.p.m. of oily condensate falls to the bottom of the condensers.

Initially . . . Under original plant conditions, the condensate was picked up by a centrifugal pump and sent to an A.P.I. oil separator, where as much oil as possible was collected. From here, the condensate was then pumped to the nearby refinery for inclusion in its larger settling system.

The oil concentration in the condensate varied from 2,000 to 5,000 p.p.m. as it entered the separator. A considerable amount of the oil carried over with the condensate could not be recovered in the separator and was a total loss to the butadiene plant. This



SCHEMATIC FLOW DIAGRAM for Cities Service condensate-recovery system. Fig. 2.

was due to the action of the centrifugal pump which served to emulsify the condensate stream with the oil to such an extent that it was difficult to recover a reasonable amount of oil in the separators.

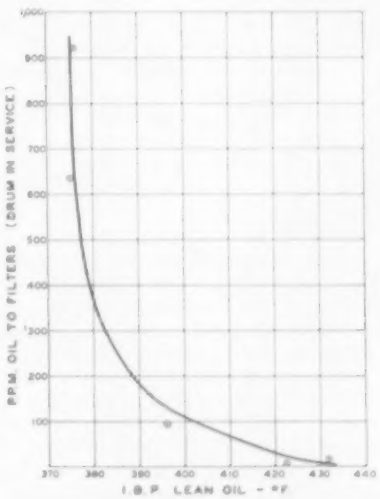
Settling drum . . . It was decided to remove the centrifugal pump at this point and to install a settling drum to receive effluent. A 9-ft.-diameter by 28-ft. drum was available at the plant and was installed horizontally for this service. Two liquid-level controllers were included, with one functioning so that slop oil would be withdrawn from the upper layer in the drum, and the other tied in with the oil-water interface, controlling flow of the condensate to the A.P.I. separators.

These modifications resulted in an immediate and significant improvement in oil carryover of the condensate. The elimination of the centrifugal action, which had increased the emulsification in the condensate, and the holding time afforded by the drum were such as to allow about 96 per cent of the oil to be withdrawn to slop from the drum. At the same time, the load on the separators was eased to the extent that instead of pumping the pits out several times a shift, once a day was sufficient.

P.p.m. variation . . . The oil content of the condensate leaving the drum dropped to an average of 180 p.p.m. (based on oil later recovered at the filter). However, there was the wide variance in oil concentrations of the condensate. In two readings taken a week apart, the oil content was reported as 926 and 641 p.p.m., respectively, as analyzed by the Noll-Tomlinson method. A month later, the two weekly analyses were 3 and 25 p.p.m., respectively. An explanation of this is in the operating conditions in the unit and the boiling range of the gas oil.

The effluent condensate picks up oil from the gas-oil carried overhead with the steam and hydrocarbon in the stripper-scrubber. The amount which is carried over with the effluent fluctuates according to the initial boiling point of the oil, and the flow pattern and steam rate. An increased steam rate increased turbulence in the unit and increased oil carryover.

An example of the effect of i.b.p. of the lean oil upon the concentration of oil in the condensate leaving the drum may be seen in Fig. 3. With an i.b.p. of the lean-oil makeup to the stripper-scrubber system of 420° F. or



VARIATION OF OIL to filters based on the boiling point of lean oil. Fig. 3.

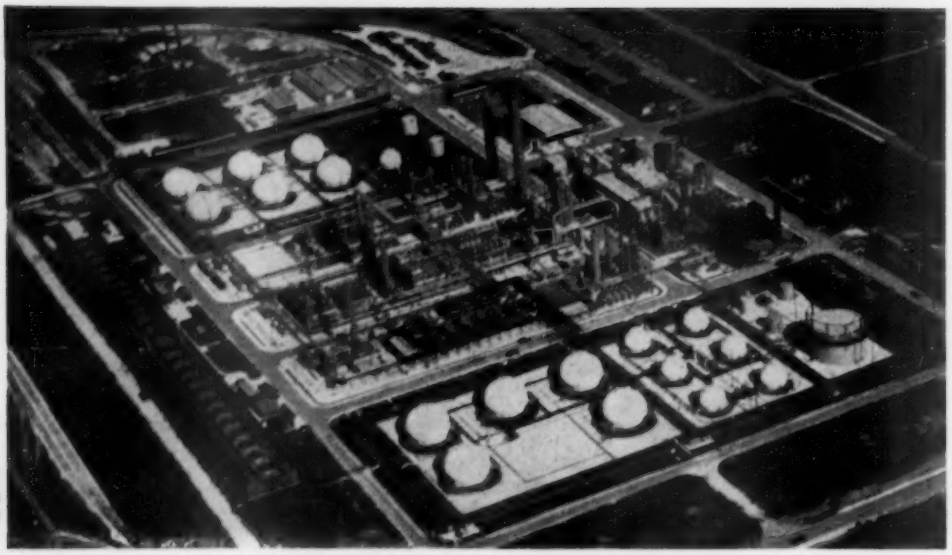
greater, only 10-20 p.p.m. of oil by analysis can be expected in the drum effluent. As the i.b.p. dropped, and the lean oil was more apt to vaporize, a sharp increase in concentration of oil in the effluent was experienced.

Considerable difference has been noted between the oil content of the condensate stream as determined by analysis and the oil content indicated by measurement of the actual amount of oil which the filters recovered from the condensate. During one test, oil equivalent to 180 p.p.m. in the condensate was recovered by the filters, but five oil analyses of the condensate feed to the filters averaged only 12 p.p.m. The analyses appear fairly consistent under a given set of operating conditions, and the difference between analyzed and recovered oil has not yet been explained.

While the oil content of the effluent was reduced to a point where there was no longer an undue load on the separators, the condensate was still too contaminated to be used for cooling-tower purposes. Water was still being lost to the plant, and it was deemed advisable to recover this water, ease the load on the refinery's settling basins, and end the necessity of maintaining a pipeline between the two plants for the transfer of effluent.

Filters . . . As a result, four vertical pressure-type filters were installed in parallel, which received effluent from the drum and discharged condensate to the cooling towers with a 0-1 p.p.m. oil content. The filters each provided 247 sq. ft. of filter surface and were designed for a flow rate of 1 g.p.m. per sq. ft. of surface, on the basis of pilot-plant studies. With a total flow rate of approximately 750 g.p.m., it was possible to pull one unit off the line for backwashing and cleaning without surpassing design conditions on the other three.

The economic justification for the cost of installing the filters was based on the use of the condensate in the plant cooling-tower system. By using condensate as makeup water, it was anticipated it would be possible to concentrate the circulating cooling tower water to eight cycles instead of only



AERIAL VIEW of Cities Service Lake Charles, La., butadiene plant.

four cycles, since the condensate had no calcium hardness. However, it was found that the filtered condensate contained from 0.5 to 1.75 p.p.m. total iron, which reacted with the phosphate in the corrosion inhibitor and precipitated. As a result it was necessary to keep adding an excessive amount of corrosion inhibitor to react with the iron in the condensate. Thus, the savings from the increased concentration of the circulating cooling water were being offset by the increased use of corrosion inhibitor in the makeup water.

Iron filter . . . To offset these conditions two of the filters were used in parallel to break the oil-water emulsion, and the other two were used to remove iron oxides from the condensate. The increased flow per filter resulting from this arrangement was compensated for by the fact that the filters were originally designed for the severe conditions existing prior to the installation of the drum.

The iron, being in dissolved form, is able to pass through the first two filters. The condensate stream is then aerated to oxidize the iron, and the oxide is removed by the second filtration. This reduces the iron content to 0.1-0.2 p.p.m. total iron. At the time this switch was made, the use of organic corrosion inhibitors was begun in the condensers and served to reduce the total iron content considerably.

Condensate . . . Present flow of condensate is now as shown in Fig. 2. Upon leaving the ammonia and water condensers, the condensate passes into holding drum F-324, where most of the oil is removed and sent to slop storage. Condensate effluent is then charged to the parallel filters G-503 and G-504, where the emulsion is broken and the stream charged to settling drum F-530. Condensate withdrawn from this drum is discharged into the hot side separator, where it is aerated and the iron oxidized.

Suction taken from this separator is passed in parallel flow through filters G-501 and G-502 where iron oxide is filtered from the condensate, leaving it in satisfactory condition to be charged to the cooling towers. Surge capacity of the hot side separator permits taking one filter unit out of service for backwashing.

Water leaving the last-stage filtration step is at a temperature of about 160° F. However, it is added in split streams to 5 of the 24 cooling-tower cells and raises the temperature of the water in each cell only 2°. While the filtered condensate is usable in process water, it is still not pure enough to be used as boiler makeup water, and this problem is currently under study.

It has been noted that over a period of 6 to 7 months, a dark deposit has built up on the drift eliminators of the cells of the cooling tower where the condensate is received. It does not appear to be an oil sludge, and might be an algae or growth which possibly thrives in the condensate conditions. It is not a serious problem, although it is being kept under close scrutiny.

Filter operation . . . The particular filters as shown in Fig. 1 in this installation are vertical units, with a cylindrical shell, having a cone-shaped bottom section and a domed top. Filter elements, 54 in each unit, are suspended from a horizontal plate located near the top of the cylindrical section of the filter. The elements themselves are cylindrical and a plan view of the plate would be similar to that of a tube sheet in a heat exchanger having large-size tubes.

An aligning pin is seecured to the bottom of each element and sets into a bar in the lower portion of the filter, thereby providing rigidity to the individual elements. A number of bars, providing sufficient holes for the elements, run along the bottom of the filter and are securely welded, with holes positioned to maintain the individual elements in a vertical position.

The filter element consists of 24 by 110 monel mesh screen wrapped around a stiff wire frame, which acts as a support for the screen.

In operation, filter aid is added to the unit, and forms a cake on the screen. Condensate, injected through an inlet port in the apex of the cone-shaped bottom, passes through the filter cake and screen into the interior of the cylindrical-shaped elements and upward above the horizontal supporting plate. Withdrawal is made through an outlet port located a few inches above the plate.

In operating the first two filters as emulsion breakers, about 200 lb. of filter aid is used in forming a precoat on the filter elements. These filters have a total height of 9¼ ft., disregarding supporting structures, and an outside diameter of 5 ft. The charge is sufficient for about 1,000 hours' operation, after which, backwashing and recharging take place.

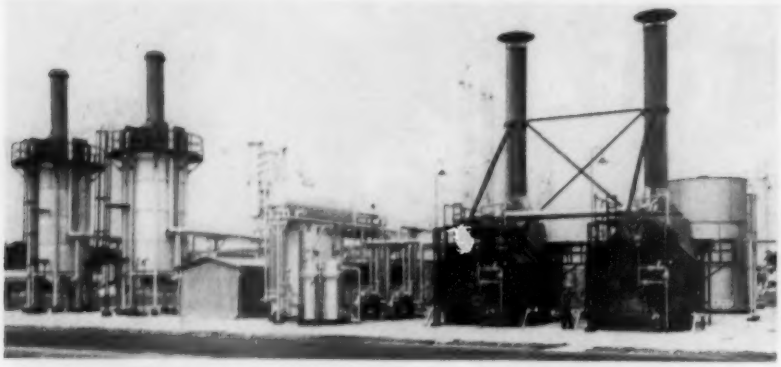
When filtering iron oxide with the second pair of filters, 100 lb. of filter aid is used as charge, but it is removed, the filter backwashed, and a new charge inserted every 24 to 36 hours.

Acknowledgment

Cooperation of the management of Cities Service Refining Corp. and Reconstruction Finance Corp., Office of Synthetic Rubber, for permission to publish this article is hereby acknowledged. Appreciation is also expressed for assistance rendered by Thomas R. Mason, R. C. Hatfield, and J. C. Nutter, Cities Service engineers, in preparation of the article.

VISCO
REG. U.S. PAT. OFF.
OIL TREATING
507
COMPOUND
55 U. S. GALLONS
VISCO PRODUCTS CO. Inc.
HOUSTON, TEXAS

Flare gas compressed in bay-located stations is . . .

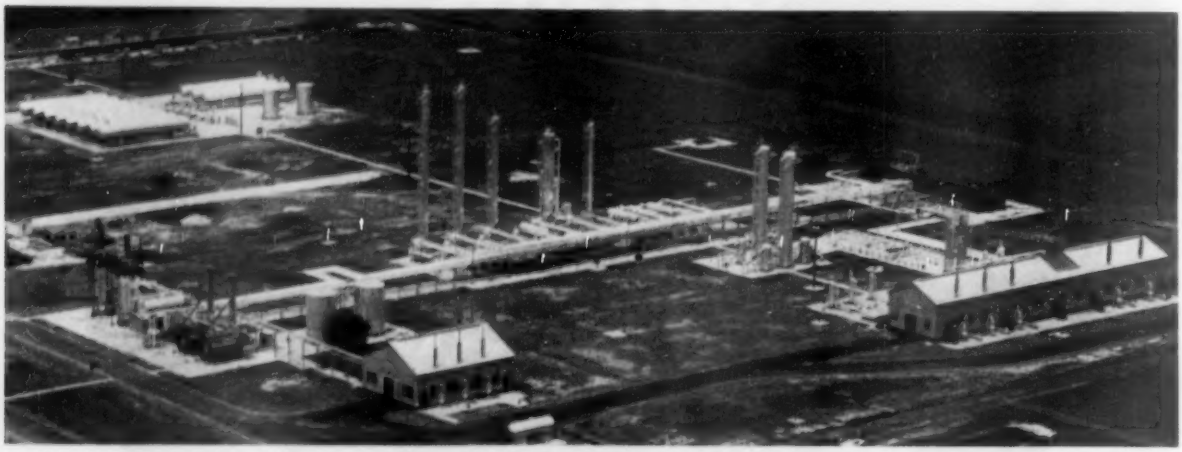


processed in this Texaco natural-gasoline plant . . .

CONSERVATION

Gas Gathered Locations Will Feed Large

Five remote compressor stations, 88 miles of trunk gathering lines, and the Paradis gasoline plant, which will ultimately handle up to 115 mil-



and residue gas feeds this Lion Oil plant plus American Cyanamid's plant

WITH the placing on stream of the Paradis gasoline plant near New Orleans, The Texas Co. completed a major conservation project which provides for the utilization of oil-well gas from almost inaccessible locations in South Louisiana bays and marshes.

An interesting twist to the program is that the gas is not only being stripped of its liquefiable hydrocarbons by a plant located 35-55 miles from some of its major gas sources, but the residue gas will end up powering and feeding two massive petrochemical plants in the general vicinity of the processing plant.

In a quick bird's-eye view, the project entails the following features:

● **Remote compressor stations . . .** Five compressor stations have been installed for handling field gas. Two of the stations are submersible-barge type which were floated in and sunk at the field location.

● **Major gathering lines . . .** Eighty-eight miles of trunk gathering lines have been laid to carry gas from the field compressor stations to the Paradis gasoline plant.

● **Paradis gasoline plant . . .** Approximately 115 million cubic feet of gas ultimately can be processed at the plant. About 50 million capacity is available for gas production in the adjacent area, with the rest coming through the main gathering system.

Another unusual feature is the high volume of extremely lean gas (less than 1 gal. per M.c.f. gas) of recoverable liquids being processed. A reabsorber is included in the process scheme. The plant is designed for a recovery of 40 per cent of propane and 90 per cent of total butanes.

● **Petrochemical supply . . .** After the gas has been stripped, a substantial amount of gas will be supplied American Cyanamid Co.'s new ammonia plant and Lion Oil Co.'s new petrochemical plant on the Mississippi River nearby.

Field stations . . . The Paradis Gasoline

IN LOUISIANA

From Offshore Power and Chemical Plants

lion cubic feet of gas per day, are used to salvage gas that would otherwise be flared in remote South Louisiana bays and marshes.

by F. Lawrence Resen
Gulf Coast District Editor

LAKE PELTO COMPRESSOR STATION is of the submersible-barge type. Three 660-hp. compressors are used to compress 11 million cubic feet of gas per day from 45 to 840 psi.

HOSES AND FLEXIBLE JOINTS, on low and high-pressure lines, respectively, are used at barge compressor stations to protect against line breakage in case barge shifts.

Plant Gathering System was set up to collect gas from fields in the southern part of Terrebonne and Lafourche parishes as well as from Paradis field. To accomplish this, compressor stations were established at Caillou Island, Lake Pelto, Lake Barre, Leeville, Golden Meadow, and Paradis. The Caillou Island and Lake Pelto stations are both submersible-barge type, with the former having 3,960 compressor horsepower in six 660-hp. units and the latter having 1,980 hp. supplied by three 660-hp. units. The Caillou Island station is set up to compress approximately 22 million cubic feet of gas per day (at 14.4 psia. and 90° F.) from 45 to 840 psia., while the Lake Pelto station handles about half this volume.

At Lake Barre, two 300-hp. skid-mounted packaged compressor units are supported by a piling platform and are designed to handle about 3 million cubic feet of gas per day. The platform is located in bay waters. At Leeville, 1,760-hp. in four 440-hp. units has been installed to handle approximately 10 million cubic feet of gas. The station is mounted entirely on piling driven into the marshy terrain. At Golden Meadow, 900 hp. was previously available for gas-lift service in the field. This station has been increased by the addition of two 660-hp. units to pressure some 6 million cubic feet into the main gathering line.

The Paradis compressor station consists of three 440-hp. compressors installed as part of the plant. These units have a capacity for approximately 8 M.M.c.f. per day of oil-well gas.

Submersible barge . . . Perhaps the most interesting of the compressor stations is the Caillou Island submersible-barge-mounted installation, which has the distinction of being the largest unit of this type. Its location is about 80 miles south-southwest of New Orleans, in bay waters slightly inland from the Gulf of Mexico coastline.

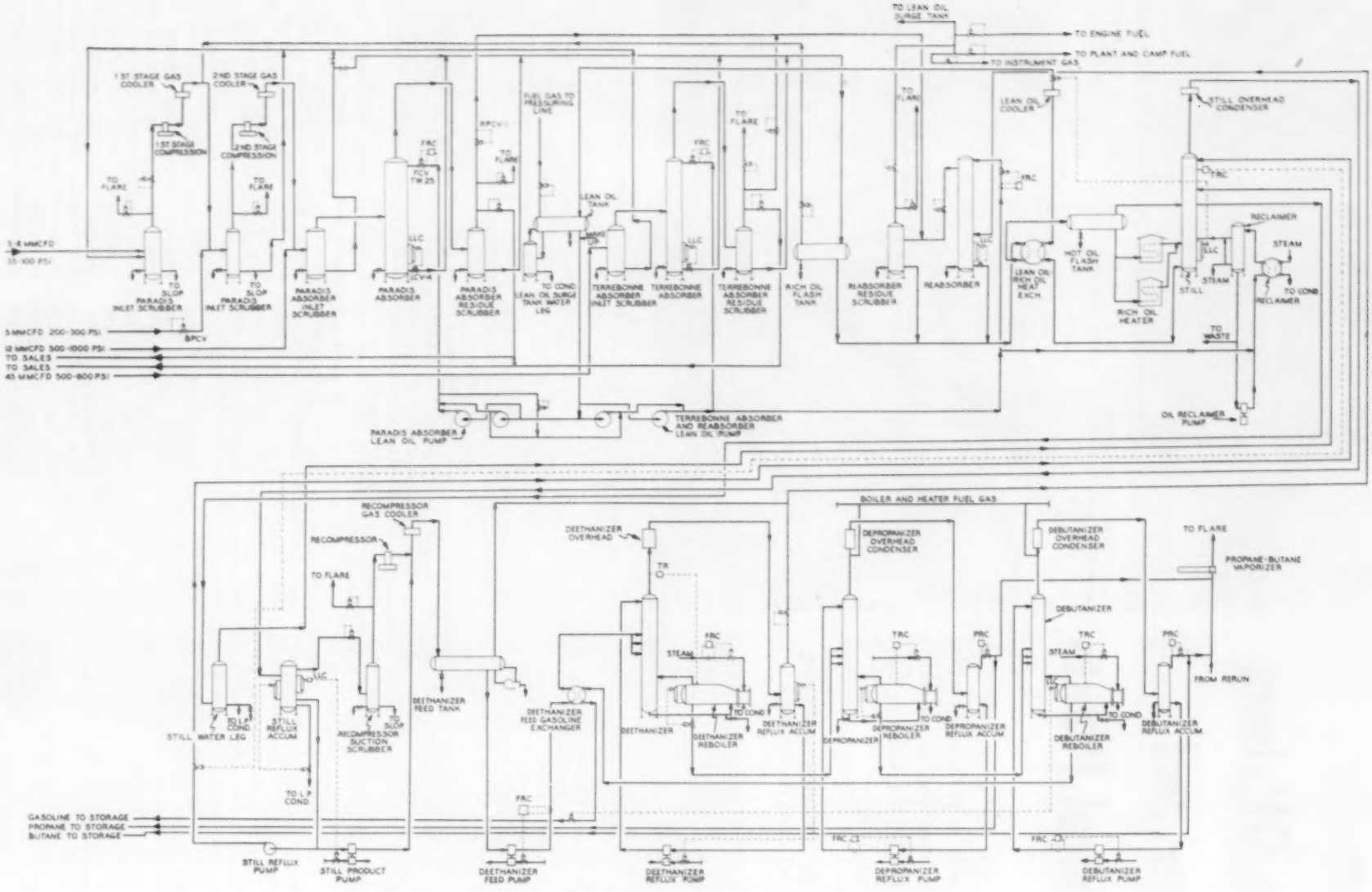
The station is similar to previously constructed ones, with an equipment deck mounted on columns extending approximately 20 ft. above a barge hull. The entire unit was towed to the station site, and the barge submerged to provide a stable base for the equipment platform.

As previously noted, the Caillou Island station contains six 660-hp. compressors plus related facilities, but a better idea of its size may be gathered from the equipment deck which measures 210 by 46 ft. The equipment platform is approximately 28 ft. above the bottom of the barge hull, which was designed for a submergence of 11 ft. below the water level. Thus, the platform is about 17 ft. above water level.

In designing the station, it was decided to provide a minimum projected area to water-wave action under severe weather conditions. With the barge hull being completely submerged, even at low tide, this would minimize the usually severe water-line corrosion, and with the operating equipment at a high level above the water, a minimum surface would thus be exposed to wave action. To assist in arriving at the above dimensions, research work done by the U. S. Army Corps of Engineers was referred to as a guide as to maximum wave crests to be expected and for the hurricane history of the area.

Protection was afforded to the columns supporting the operating deck by coating them first with conventional pipe coating and then sheathing them with an outer cement coating 2 in. thick. This was done above and below the water line, with the conventional coating serving to protect the pipe from corrosion, while the cement covering will minimize any adverse effects of abrasion, marine life, and wave action on the pipe coating.

The barge stations were designed for



SCHEMATIC FLOW SHEET for the Paradis gasoline plant.

Delta's Scene
IS ALWAYS CHANGING

Pirogues and equipment-laden barges are a familiar sight through the Delta Field Engineers' office window as modern processing plant construction progresses deep into the mineral-rich Gulf Coast areas. Marshes, swamps, and other out-of-the-way places present no barrier to Delta's engineers who can adapt with ease to any difficult location. We are equipped to design and construct your plant where you need it and within its assigned budget. From preliminary economic studies to turn-key operation, let Delta engineer your project.

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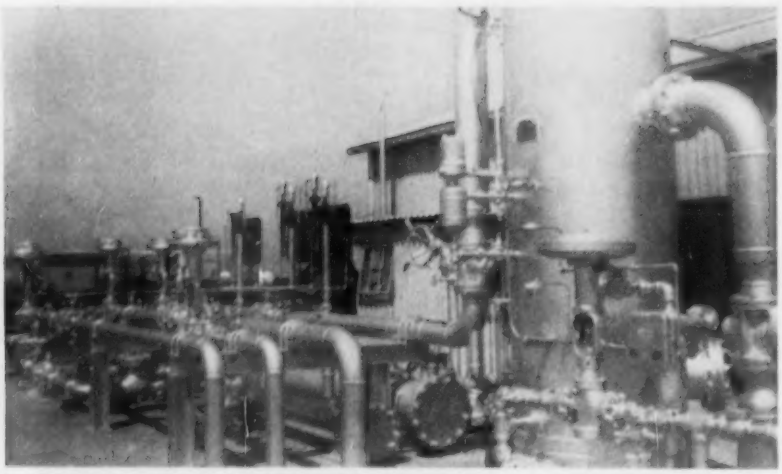


METER RUNS AND SCRUBBERS at Lake Barre station. At Lake Barre, two 300-hp. skid-mounted packaged compressor units are supported by a piling platform. Station handles about 3 million cubic feet of gas per day.

stability both afloat and submerged under conditions of 120-m.p.h. wind load. Layout of equipment and the design of the complete unit was made to provide approximately even trim in all sections of the barge without water ballast. In order to distribute the weight adequately and furnish suitable footings for the stanchions and supports of the superstructure, it was necessary to build both longitudinal and thwartship bulkheads in the hull. These bulkheads were made watertight.

A relatively firm sand bottom is in evidence at this location, and it was not felt necessary to build up a shell mat upon which the barge might rest. Instead, a slip was dug at the location, allowing 15 ft. around the barge hull, the bottom sounded to insure its uniformity and the barge submerged at this spot. With the large bearing area available to carry the weight of the station equipment, the bearing load has been held down to about 200 lb. per sq. ft., and no undue or uneven settling has been experienced.

The barge station is an integral unit, with auxiliary equipment including a generator, scrubbers, cooling systems, and automatic shutdown system. A galvanized steel building is provided on the equipment platform to form an enclosure to protect compressors and other machinery from the weather. It is divided into two rooms by a steel gastight partition, making a compressor section separate from the generator-pump room. Two rail hoists of 4,000-lb. capacity each, complete with hoists and capable of reaching outboard 8 ft., are installed for lifting light loads to the machinery deck level and are located so loads can be transferred through the double doors of the compressor house.

Gas process . . . Low-pressure field gas from the field separators flows to the first-stage suction scrubber located on the barge and then to first-stage compression. The discharge gas from this stage leaves the compressor at 65-105 psig. and 160°-220° F., is cooled to approximately 90° F. in the first-stage coolers and then enters the second-stage scrubber. Intermediate pressure gas (70-100 psig.) can also enter the scrubber directly from the separators in the field. The gas from this scrubber is boosted to 310-425 psig. and 260°-279° F. in the second stage of compression. Finally, the gas is cooled to 90° F., scrubbed and compressed to 650-1,000 psig. in the third stage of compression. Upon being cooled and scrubbed, this gas enters the gathering system for movement to the Paradis gasoline plant.

Gas arriving at and leaving the compressor station passes through flexible connections, which are provided to allow for settlement, shifting, expansion, and contraction. The low-pressure gas is transferred from the field terminus immediately adjacent to the barge by use of heavy rubber hose, while high-pressure gas is transferred through flexible steel joints.

Cooling system . . . A cooling-water system is employed to furnish jacket-water cooling for the natural-gas engines driving the compressors, the compressor cylinders, and all the natural-gas engines driving auxiliary facilities. The system also provides water for the lube-oil coolers. Fresh water circulated in this closed system receives part of its makeup supply from rain water falling on the building roof, with drains connected to the makeup surge tank.

A raw-water circulating system provides bay water in sufficient amount to provide proper cooling for the jacket-water heat exchangers and all gas coolers. Atmospheric cooling sections are used, with a deep-well pump taking suction from the bay through sea chests and discharging the water overboard after its pass over the cooling coils.

Alarms . . . To insure safe operating conditions, an air-operated horn is used as an alarm device to indicate abnormal conditions existing in either of the three-stage suction scrubbers and the third-stage discharge scrubber. An automatically operated high-level compressor shutdown system is used in conjunction with the alarm on the first and second-stage scrubbers. In addition, manual shutdown stations are conveniently located on the platform.

Contractors for The Texas Co. compressor stations were as follows: Lake Pelto and Caillou Island barges, Levingston Shipbuilding Co., Orange, Tex.; land stations, D. M. Glaser Construction Co., Lafayette, La., and Delta Engineering Co., Houston.

Gathering System

Gas from the various compressor stations moves to The Texas Co.'s Paradis plant through a major gathering system consisting of approximately 88 miles of pipeline ranging from 6 to 14-in. Branches from the outlying fields converge upon Golden Meadow, from where the remaining 36 miles to the plant is traversed by a 14-in. line.

Beginning from the farthest station, Lake Pelto, a 6-in. line is laid 5½ miles to a junction point where gas from Bay Ste. Elaine is picked up, and the combined stream passes through an 8-in. line to Lake Barre, 10 miles distant. A junction at this point picks up gas from the Lake Barre station and also receives gas from the 10-in. line from Caillou Island. The 17-mile distance from Lake Barre to Golden Meadow is covered by a 12-in. line.

At Golden Meadow, the gas passes into the aforementioned 14-in. line, along with gas from the Golden Meadow station and that from the Leeville station, 11 miles to the south and connected by an 8-in. line.

At the present time, the system is operating somewhat below the maximum design pressure of 1,000 psi. at the terminal locations. Initially, the pressure drop in the system amounts to 250 psi., while the ultimate design will allow a maximum 500-psi. drop from the outer stations to the plant. This provides for the handling of increased volumes through the line as additional gas becomes available in this area.

Construction . . . The nature of the terrain in this portion of South Louisiana meant that a variety of construction problems had to be faced in the building of the gathering lines. Some portions were laid in bay waters, others

White Fuel Corporation's deep-water terminal, strategically located near the center of metropolitan Boston.

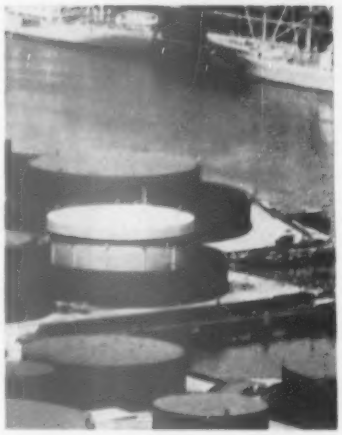
17 Bethlehem Oil Storage Tanks at White Fuel's South Boston Plant

This is the 1,500,000-bbl-capacity deep-water terminal of the White Fuel Corporation, one of New England's oldest and largest independent fuel suppliers. Here ocean-going tankers and coastal barges discharge refined products for domestic, industrial and commercial consumers throughout a widespread, bustling area.

Since 1938, White Fuel has steadily increased its storage capacity and now has a total of 17 tanks fabricated and erected by Bethlehem. These include a 154,000-bbl tank, three 121,000-bbl tanks, seven tanks varying from 50-100,000 bbl, and six of smaller sizes.

In addition, Bethlehem supplied eleven steel firewalls, varying from 20 to 30 feet high. The substitution of steel for earth dikes saved a great deal of valuable space, making it possible to install maximum tankage in the limited area.

If you are in the market for oil storage tanks, just contact the Bethlehem sales office nearest you. We'd be happy to answer your questions—and bid your requirements—promptly.



Especially adapted to severe Boston winters, this 67,000-bbl Bethlehem Lifter-Roof tank effectively controls air-vapor — minimizes breathing losses.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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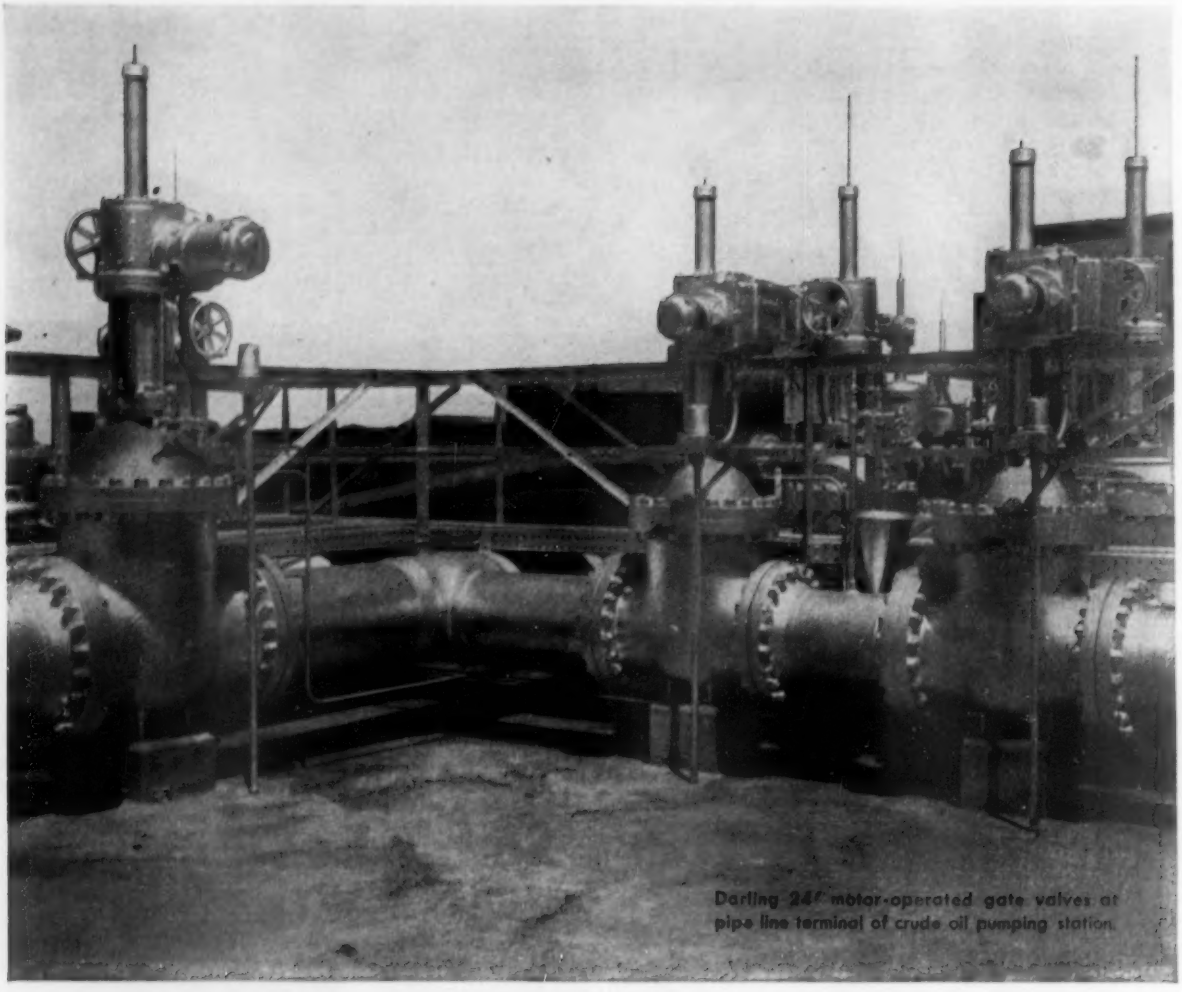


Darling 24" motor-operated gate valves at pipe line terminal of crude oil pumping station.

Why Darling gate valves work better... longer!

HERE'S the simple answer. There's little that *can* go wrong with Darling *fully revolving double disc, parallel seat gate valves.* This unique principle recognizes and thus *avoids* the common sources of valve failure . . .

Take seat misalignment for example. The Darling principle automatically compensates for this common cause of leaks! Then too, there's *uniform* distribution of disc-and-seat wear, positive relief of wedging pressure as discs unseat, and *easier operation* even under pressure and temperature extremes.

Finally, with these Darling gate valves that work better, longer, you naturally minimize down time and maintenance expense. Why not get all the facts on Darling gate valves of the proper size and type for your own service needs? We'll be happy to cooperate.

DARLING VALVE & MANUFACTURING CO.

Williamsport 1, Pa.

Manufactured in Canada by Sandilands Valve Manufacturing Co., Ltd., Galt 19, Ontario

in marsh or swamp, and the remainder in solid ground.

These conditions meant that in some areas conventional land-laying methods could be used; in others push sites had to be set up in marshes; while in others, complete barge-laying methods were required. To facilitate the laying of the 14-in. line, a barge canal was dug between Bayou Lafourche and Bayou des Allemands, so that the major portion of this section could be laid directly off the lay barge.

The line was coated with pipeline enamel and felt wrapper, with 8-in. and larger pipe concrete-weighted to achieve sufficient negative buoyancy in the various locations. In the bay waters, this meant the entire line (excluding field joints) was concrete-coated, while in the marsh or swamp, alternate joints were concrete coated and the others were laid barren of concrete. All of the lines were ditched on the bay bottom and in the marshes.

Associated Pipeline Contractors, Inc., Houston, and L. E. Farley Co., Houston, laid the gathering system lines for The Texas Co.

Paradis Gasoline Plant

The Paradis gasoline plant is located in St. Charles Parish, approximately 25 miles west of New Orleans and adjacent to U. S. Highway 90. The plant has been designed to handle 115 million standard cubic feet per day gas from two primary sources: the Paradis Gasoline Plant Gathering System and Paradis field gas in the immediate area.

Due to the differences in sales delivery pressure requirements, a dual-absorber system has been included in the plant. The high-pressure absorption system will handle gas over a pressure range of 500-1,000 psig., and has a capacity of 50 M.M.s.c.f.d. at 600 psig.

The intermediate pressure absorption system will operate at 500-600 psig. and has a capacity of 65 M.M.s.c.f.d. Gas from this processing step will be delivered to the two petrochemical companies located near by.

Residue gas not delivered to the chemical plants will be passed through to a compression-dehydration unit for delivery to a gas transmission line.

Initially, the plant will be operating on a total of 65 M.M.s.c.f.d., with the high-pressure system having approximately 20 M.M.s.c.f. and the intermediate system 45 M.M.s.c.f.

Under these conditions, the plant was designed for extracting and recovering 40 per cent of the propane, 90 per cent of the total butanes, and 98 per cent of the pentanes, when including absorption oil loss in the residue gas as a pentane-plus component.

Process flow . . . The major part of the plant inlet gas is available at absorption pressures, with the only primary compression involved being to handle about 3 M.M.c.f. of 30-psi. oil-well gas and 5 M.M.c.f. of 200-psi. oil-well gas from Paradis field. This is accomplished by boosting the 30-psi. gas pressure to 200-300 psi., combining it with the 200-psi. oil-well gas and then boosting the combined stream to 500-1,000 psi. absorption pressure for charging to the high-pressure-absorber inlet scrubber.

Scrubbed gas is charged to the high-pressure absorber where it is contacted by a lean-oil stream, with the stripped gas entering a residue-gas scrubber prior to entering the high-pressure sales line. Rich oil meanwhile leaves the absorber and is flashed in the rich-oil flash tank, from where overhead gas is recompressed in the second-stage compression stream.

A parallel arrangement is in effect with the intermediate absorber system. The same steps of inlet scrubber, contact with lean oil in the absorber and passing into the residue scrubber and finally the sales line are followed by the 500-600-psi. plant gathering system gas. Likewise, the rich oil joins the high-pressure-absorber oil stream and is flashed into the rich-oil flash tank, with only a single stream to be followed through the plant from this stage.

Rich oil from the two absorbers is heated by passing through the rich oil-lean oil exchangers, then charged to the hot-oil flash tank prior to entering the still. Vapors from the flash tank are charged to the upper section of the still, while the rich oil is heated in direct-fired heaters and then enters the middle of the still. Absorbed components of the rich oil are stripped out in the still, with both the still overhead and the overhead vapors increased in pressure before being fed to the fractionating system.

This feed to the fractionating section is charged to the deethanizer feed tank from where vapors which still flash off are recovered and charged to a 300-psi. reabsorber, for further handling. This reabsorption is especially necessary due to the very lean mixture of absorbed components obtained from the absorber.

Water . . . Two interesting features of the plant are its water supply and steam utilization. In the former instance, an investigation into a water source indicated that there was no supply of subsurface water available for processing purposes. However, there is an abundance of surface water located in the marshes and bayous in this locality. This led to the installation of a water line, and pumping facilities, to pick up water from a nearby oil-field canal, fed from Bayou des Allemands.

Water from this canal is pumped through a coil shed on a once-through basis and then disposed of in another canal to minimize recirculation of warm water back to the plant cooling system. This natural cooling source meant that no cooling tower would be necessary in the plant, and at the same time it reduced treating requirements by eliminating the concentration of solids in the cooling system.

Steam . . . In designing the steam facilities, the decision was reached to utilize completely all of the steam generated, either in power drives or for process and space-heating requirements. This approach was based on four premises: (1) higher conversion of fuel to recoverable energy in boilers than in conventional gas-engine drives, (2) a preference to utilize essentially all of the available energy in the generated steam, (3) a desire to avoid the installation of steam condensers as such, and (4) a wish to avoid the attendant loss of the latent heat of steam when using condensers.

The above conditions necessitated that some of the drives would use 300-psi. steam, while the remainder would use electric motors. Three 400-kw. gas-engine-driven generators are used for electrical power. Exhaust steam from the power drives goes to satisfy the major portion of process and space-heating requirements. However, the maximum exhaust steam available will always fall short of minimum steam requirements, with makeup steam being obtained directly from the boilers. This insures that all of the exhaust steam will be used before any makeup is necessary.

Process heating requirements are sufficient to condense all of the steam at the available exhaust pressure, and this makes it possible to eliminate outside condensers. The economical aspects are excellent, for it is possible to recover, in effect, all of the latent heat as well as most of the sensible heat in the steam. In addition, the number of potential points of loss from the condensate system have been minimized and the condensate returns are consequently very high—about 90 per cent.

The design conditions and basic process scheme of the Paradis plant were set up by The Texas Co. engineering group and the design, engineering and construction of the plant was done by O. L. Olsen Co., Houston.

Acknowledgments

The cooperation of the management of The Texas Co., R. H. Park, production department, gas division, Houston, and Dick Rawls, production department, Louisiana division, New Orleans, for their assistance in the preparation of this article is gratefully acknowledged.

Strawn Pinchout Sparks Drilling At Jameson

Cost of a completed well, with tanks, is about $10 per foot and the wells are definitely economic

by Norman S. Morrisey
Drilling-Development Editor

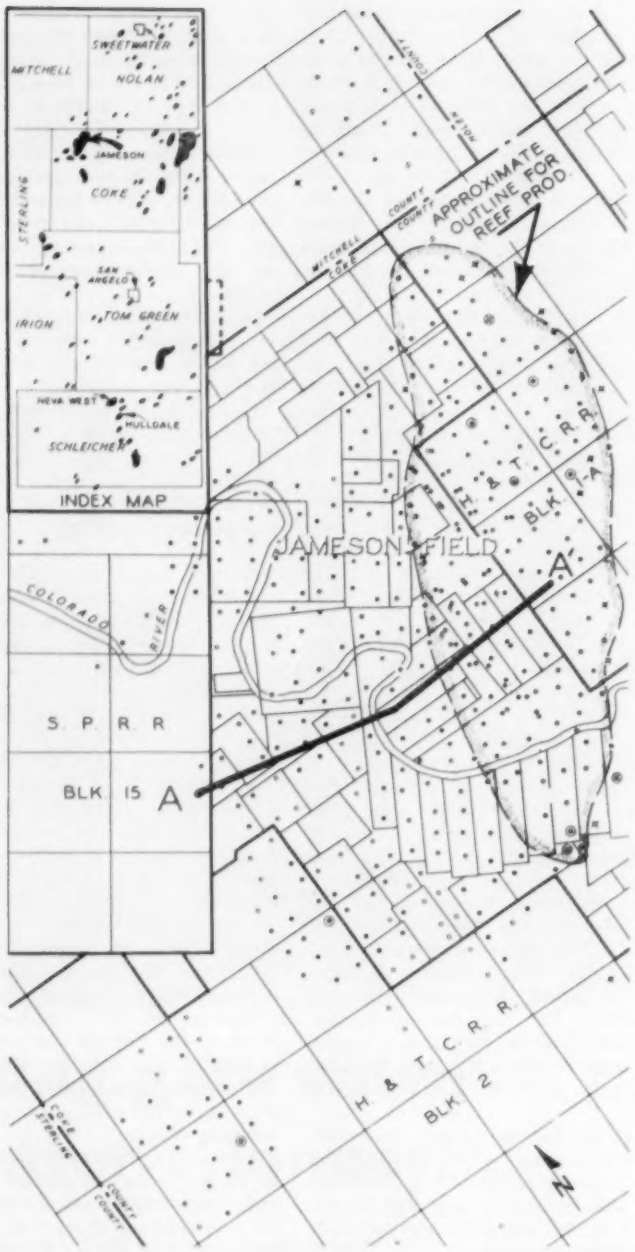
JAMESON (Strawn) pool is one of the most active fields in West Central Texas today with 10 rigs running and 14 new locations. Indications are that a vast area on the west flank of the Strawn reef will be productive from the Strawn sands. Similar sand development is expected on other large reefs in the area.

Reef production was first established in the field December 13, 1946, with the completion of Sun Oil Co.'s 1 Jameson for 168 bbl. of oil per day. During the early development work, the Strawn reef was the primary objective, and it was not until January 1952 that a Strawn sand oiler was completed on the west flank of the field. Since then, development of this zone has been rapid with wells producing at an average depth of 6,200 ft.

Geology

Jameson reef is a large north-south-trending mass located in the northwestern part of Coke County. It is approximately 10 miles long and 5 miles wide. Production from the reef is limited to an area 6 miles long and 2 miles wide (Fig. 1). The east side of this reef is very sharp while the change from limestone to shale on the west side is more gradual.

The Strawn sands, main objective in the present drilling program, are missing on the crest of the structure, pinching out over the reef (Fig. 2). Although these sands are produced as a single zone, some operators consider that they



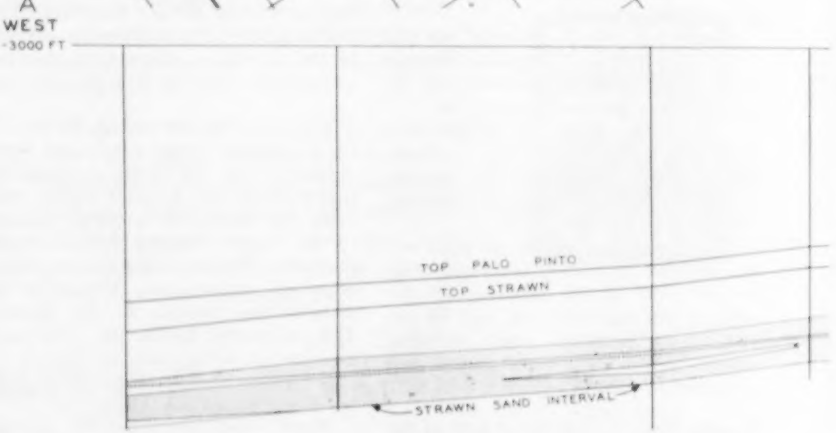


Fig. 1—(Right, above) Strawn sand production on the flank of the Jameson reef now covers about 9,000 acres and is continuing to expand as more development wells are drilled. (Base map courtesy of Southwest Mapping Co.).

Fig. 2—(Right) West-east cross-section shows the development of the Strawn sands downdip from the reef structure. Notice that these sands are absent on the crest of the reef.

are actually a number of separate sands which may be in communication.

Wedge-edge production on the flanks of these Strawn reefs is unusual. Similar conditions are considered to exist on the west flank of the Neva West in North Central Schleicher County, although this reef is considerably smaller than the Jameson reef. This fact may account for the very small producing area at Neva West.

Surface geology is given the most credit for the discovery of the Jameson reef. Subsurface studies showed the pinching out of the Strawn sands updip and this stratigraphic trap was confirmed by the Chester Hunter 1 E. E. Stagner, completed January 11, 1952, for an initial potential of 141 bbl. of oil per day.

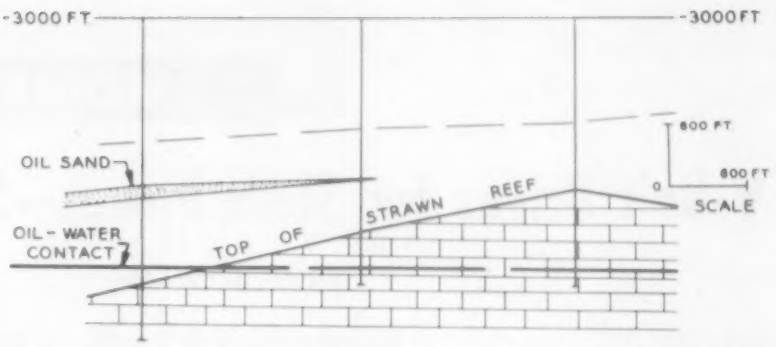


Fig. 3—Similar sand development is believed to exist at Neva West field in Schleicher County, although neither the reef nor the sand-producing area is as large as at Jameson (after Frank J. Gardner).

TABLE 1—DRILLING DATA, JAMESON FIELD, COKE COUNTY, TEXAS

Normal Rig Time Distribution

Days on footage rate	24
Days on day work rate	4
Total days (spud to rig release)	28

Bit Data

Total number of bits	36
Feet per bit	175

Typical Equipment

Derrick: 127-ft. cantilever
Draw works: U-15
Motors (No., hp.): 2 at 300 hp. each
Pumps: One 7¾ by 16-in.
Fuel: Diesel, butane, or natural gas
Water supply: River, tanks, or wells
Nearest supply center: Colorado City (25 miles)
Terrain and roads: Good condition

Casing Program

	O.d. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	9⅝	500-1,000	400-500
Oil string	4½	6,200	300-600

Typical Mud Properties

Interval (ft.)	0-500	500-5,000	5,000-TD
Type mud	Spud	Water	Gel
Wt. (lb./gal.)	8.5-9.4	8.5-9.4	9.6
Filter cake (in.)			2/32
Water loss (cc.)			15-30

Mud Summary

Material—	Amount
Bentonite, sacks	300
Clay, sacks	70
Caustic, lb.	600
Quebracho, lb.	700
Driscose, lb.	200
Soda ash, lb.	2,000

Reservoirs . . . Strawn sands are now the principal target for the bit and are encountered at depths ranging from 5,800 to 6,800 ft. These sands occur in a zone 200-300 ft. thick and are produced as one reservoir. The average porosity is 10 per cent and permeability values range from 0.02 to 1,800 md. Pay thicknesses are variable depending upon the nearness of the well to the undip limit of the sands (Fig. 2).

Cost of a completed well, including tanks, is about $10 per foot and the wells are definitely economic. Most field wells are completed flowing from the Strawn sands for a daily production of 150-300 bbl. per day on small chokes. Daily output from this zone is 8,700 bbl. of 47.8°-gravity oil from 220 wells.

During the early drilling, the Strawn reef was the main reservoir. This zone had an average pay thickness of 190 ft. and produced 46°-gravity crude. Present daily output from the reef is 6,700 bbl. from 140 wells.

Both reservoirs are on 40-acre spacing and some wells have been dually completed.

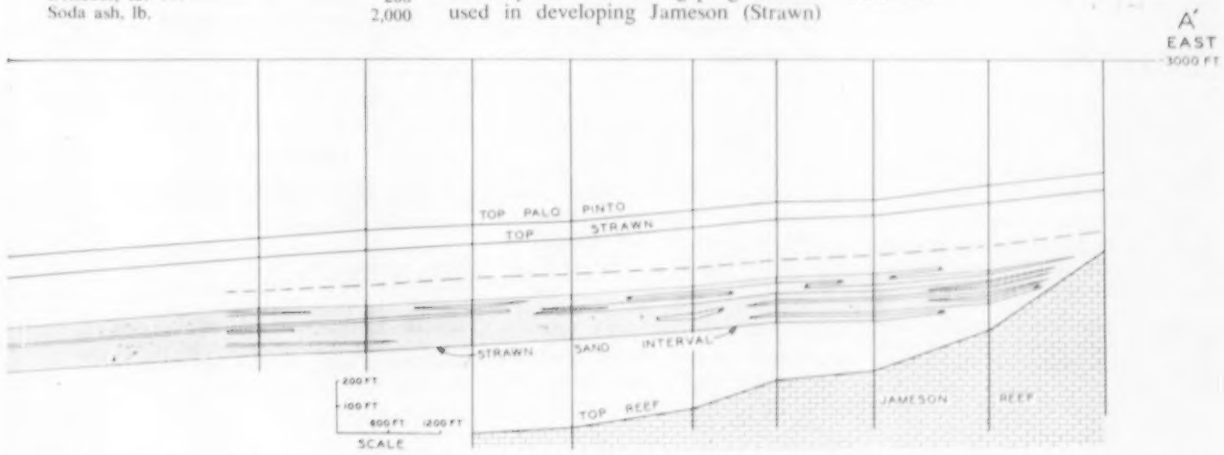
Fairly uniform drilling programs are used in developing Jameson (Strawn) field. Contractors usually set about 500 ft. of surface pipe, drill through the pay, and run 5½ or 7-in. casing. Operators perforate the pay zones, fracture the sands, and complete the wells flowing for an average daily output of 200 bbl. per well on small chokes.

Contractors require about 28 days to complete a 6,300-ft. well and use 36 bits; mud costs are relatively low. Table 1 summarizes the drilling and completion data.

Future flank production . . . Jameson is the most important reef field currently active where flanking sands produce. Several of the large reefs in West Central Texas should have similar sand conditions and eventually produce. Detailed cross-sections are the best method for isolating these plays by comparing the downdip sand development against the section on the crest of the reef. Isopach maps are of value in showing regions of divergence where sand development can be expected.

Strawn sand production at Jameson is controlled by pinchout or nondeposition of sand updip over the reef as well as laterally along strike to the northeast and southwest.

Careful geologic study and the bit are the only sure way to find another Jameson.



V-Belt Drives for Slush Pumps—5

by W. S. Worley

SOUND engineering judgment must be used in the application of the horsepower ratings given here to a specific drive problem. Consideration must be given both to the power requirement of the pump and the power available from the prime mover. For example, if one or more engines are used solely to drive the pump, sufficient belts should be used to give a total-drive horsepower rating equal to or in excess of the total maximum continuous rating of the engines with accessories, without regard to the rating of the pump. This results in a drive suitable for all the power which would normally be supplied to the pump. Long periods of operation at maximum intermittent power will shorten the service given by the belts, but these periods should be relatively infrequent and would be offset by periods during which the engines were operating at less than rated power output.

The problem is not quite so simple in the case of the conventional rig, with two to six engines compounded to two pumps, the rotary table, and the draw works. The number of belts to be used on the drive in this case depends primarily on the pump, and not on the engine power available. The total rating of the drive should equal or exceed the maximum horsepower at which the pump manufacturer will allow the pump to be operated continuously. This, it should be pointed out, is not necessarily nameplate rating of the pump. Again, substantially more power may occasionally be carried by the drive in case of emergency, but again such periods must be balanced off against periods when the pump is operating at substantially lower power input.

When the rig is equipped with torque converters between the engines and the pump driver sheave, it is necessary to weigh the operating characteristics of the converter in choosing the number of belts to be used on the drive. It is well known that a torque converter will deliver approximately constant horsepower over a wide range of converted-output speeds. This suggests that the drive should be designed on the basis of the converter-output speed at the highest converter-speed ratio recommended for continuous operation. This is sometimes expressed as the maximum per cent continuous "slip" recommended for continuous operation.

On the other hand, such a procedure implies that the pump may be rated at constant hydraulic horsepower throughout the speed range for continuous operation of the converter. While it is true that the converter will permit as much as a 25 per cent increase in fluid end-pressure ratings[3] because of reductions in the fluctuation in pressure, the designer should check with the pump manufacturer to see whether the hydraulic rating of the pump can be maintained constant over the range of speeds corresponding to those at which the torque converter will operate at constant horsepower. If so, then the design may be based on the low output speed of the converter. If not, the design should be based on the maximum rated power of the pump at the reduced speed.

At times a pump driven through a torque converter may be run considerably above its rated speed. The resulting higher belt speed will not be serious so far as the belts are concerned. It would be well, however, to dynamically balance the sheaves for such drives if the belt speed will greatly exceed 5,000 ft. per minute. If speeds over 6,000 ft. per minute are possible, then some attention should be given to the strength of the pump sheave, as well as to its balance.

The use of idlers operating on the back of the belts in order to guide them over the edge of the substructure of the rig is, fortunately, becoming less prevalent. Such an idler transforms the drive into a system which is mechanically in an unstable state of equilibrium. The drive then becomes subject to self-excited transverse vibration which is capable of causing the belts to turn over, to tangle with each other, and be cut off as they enter the sheaves, or to be thrown off the sheaves. Belts with longitudinal rubber ribs on the back successfully control this vibration. But even with the vibration under control, the idler results in a third stress peak in the belt as it makes each revolution around the drive.

Three stress peaks per revolution, with an idler in the drive, will wear out the belt in two-thirds the time required when there are only two peaks per revolution. If an idler is necessary, the ratings given here should be multiplied by a factor of 0.91. Under this reduced rating per belt, the service given on the three-wheel drive, including the idler, will be approximately equal to that given at the normal rating on a two-wheel drive.

We began by pointing out that the V-belt drive is a clean, dependable drive with horsepower characteristics which closely parallel those of the internal-combustion engines with which they are commonly used. We further pointed out that the V-belt drive is easy to erect, dismantle, and maintain. With the data presented here, we feel that we have shown that the V-belt drive, designed to the specific requirements of slush-pump service, is adequate to handle not only the requirements of current pumps, but the needs of the future.

Author is with Gates Rubber Co., Denver. From a paper presented at 1954 petroleum-mechanical conference of A.S.M.E., Los Angeles.

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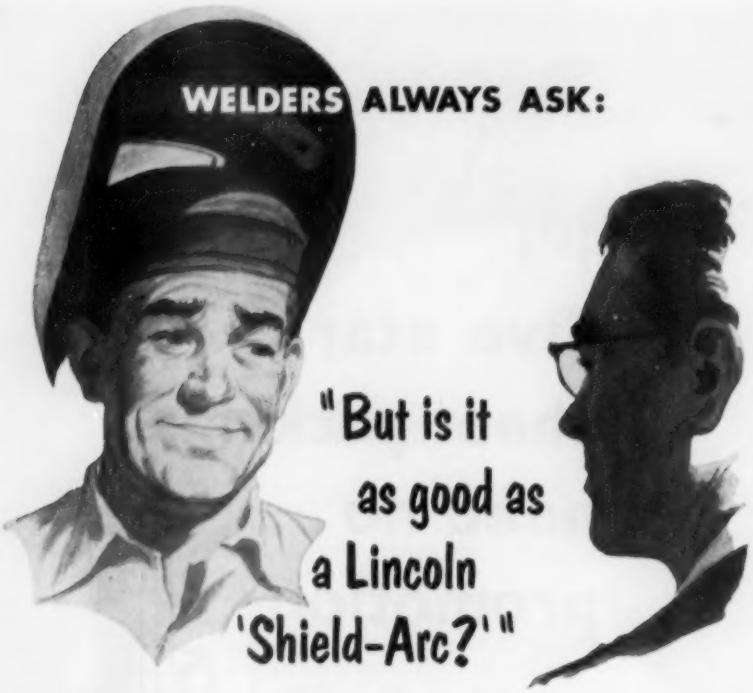

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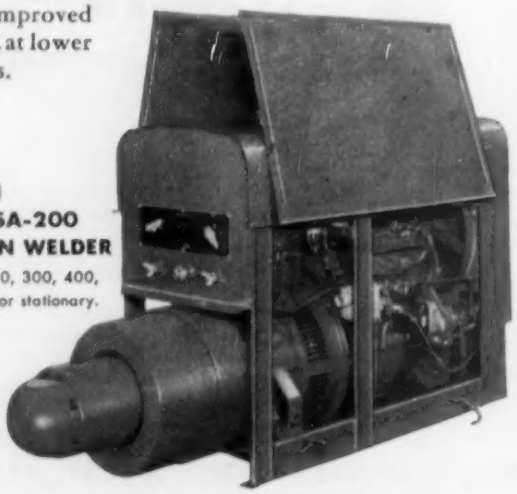

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by
Dr. R. F. Nielsen

UNSTEADY STATE FLOW IN RESERVOIRS—1

Finding the Diffusivity Equation for Gases

THE general method of solving unsteady-state flow is that of finding solutions of the diffusivity equation for specified boundary conditions. This has been done for plane-radial flow of liquids by Muskat and by Hurst and van Everdingen. A review of these solutions was given recently in this Journal. The diffusivity equation for gases, however, does not have a general analytical solution, and certain numerical, analog, graphical, and transformation methods have been resorted to.

The diffusivity equation is a combination of the continuity equation with Darcy's law. For linear flow the continuity equation may be derived by reference to Fig. 1. At x_o the mass rate of flow is w, and at a distance Δx further, the rate is $w - \Delta x\ (dw/dx)$. The difference is the rate of accumulation of mass in the Δx segment. Rate of change of density, ρ, in this segment is rate of accumulation of mass divided by pore volume, so the continuity equation is:

$$\frac{d\rho}{dt} = \frac{-\Delta x}{Af\,\Delta x}\frac{dw}{dx} = \frac{-1}{Af}\frac{dw}{dx} \qquad (1)$$

where A is cross-sectional area and f the fractional porosity. According to Darcy's law, taking the usual symbols and units:

$$w = -(K/\mu)\,\rho A\,(dp/dx) \qquad (2)$$

If Boyle's law is obeyed, $\rho = \rho_o p$ where ρ_o is the density at one atmosphere. Substituting this expression for ρ in Equation 2, $\rho_o\,dp$ for $d\rho$, and Equation 2 for w in Equation 1:

$$\frac{f\mu}{K}\frac{dp}{dt} = \frac{d}{dx}(p\,dp/dx) = \frac{1}{2}\frac{d^2p^2}{dx^2} \qquad (3a)$$

or

$$\frac{d^2p^2}{dx^2} = \frac{2\,f\mu}{K}\frac{dp}{dt} \qquad (3b)$$

For plane radial flow, the continuity equation is (Fig. 2):

$$\frac{d\rho}{dt} = \frac{-1}{2\pi r\,hf}\frac{dw}{dr} \qquad (4)$$

Author is associate professor of petroleum and natural-gas engineering, Pennsylvania State University.

where h is sand thickness, assumed constant. Darcy's law is:

$$w = -(K/\mu)\,2\pi r\,h\rho\,(dp/dr) \qquad (5)$$

Making similar substitutions as for the linear case:

$$\frac{1}{r}\frac{d}{dr}[r\,(dp^2/dr)] = \frac{2\,f\mu}{K}\frac{dp}{dt} \qquad (6a)$$

or

$$\frac{d^2p^2}{dr^2} + \frac{1}{r}\frac{dp^2}{dr} = \frac{2\,f\mu}{K}\frac{dp}{dt} \qquad (6b)$$

Actually partial, instead of total differential notation should be used.

Equations 3 and 6 are the diffusivity equations for isothermal-linear and plane-radial flow, respectively, of gases in porous media, if Boyle's law is obeyed. If Boyle's law is not obeyed, then the quantity p/Z must be taken as a variable, where Z is the supercompressibility factor and is a function of p. If Z is not unity but a constant, Equations 3 and 6 are still valid.

The difficulty of solving these equations lies in the fact that p appears to the second power on the left and to the first power on the right, whereas in the case of liquid flow, p appears to the first power on both sides. If the flow is strictly steady state, the time derivative vanishes, and the right side of Equations 3 and 6 is zero. Thus, if Boyle's law is obeyed, p^2 is a linear function of x for linear flow and a linear function of log r for plane-radial flow. For unsteady state the deviation from such a pressure distribution may be considerable. Solutions of Equations 3 and 6 will be discussed in subsequent numbers of this series.

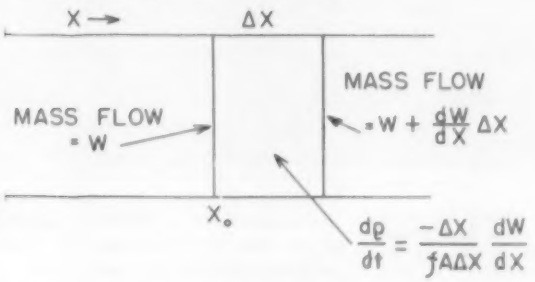


Fig. 1—Derivation of continuity equation for linear flow.

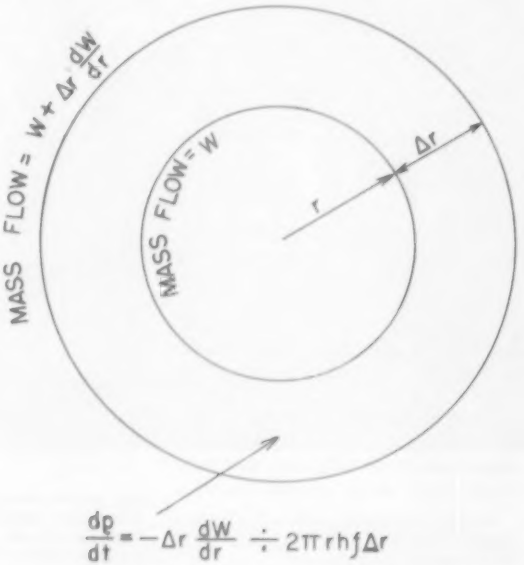


Fig. 2—Derivation of continuity equation for plane-radial flow.

by R. I. Martin

ENGINEERING FUNDAMENTALS

ELECTRIC LOGGING—42

Field Case of the S. P. Log

IF R (1 by 1 in.) is higher than a certain number of times the mud resistivity, the formation is compact, regardless of the amount and direction of separation between the curves.

If the short spacing records a resistivity lower than this value, the sign and magnitude of the separation should be examined. In cases of doubt, the S.P. log will give assistance.

1. If the separation is large, more than 20 per cent are negative the formation is impervious Case I_2.

2. If the separation is not definite, less than 20 per cent the case is indeterminate and must be solved by reference to the S.P. curve or gamma-ray log. Cases I_3 and P_1.

3. A large positive separation indicates that the formation must be permeable.

MicroLog of Ellenburger . . . Fig. 1 shows an example of the MicroLog and electric logs of the Ellenburger limestone. Particular attention should be paid to the upper part of the log where large positive separations do not correspond to permeable beds. This is a feature of a caved section of the hole and may be recognized as such. It should be noted that the short spacing records the mud resistivity of the nearby formation, and gives a resistivity which is higher than that of the mud. If the caving is large, both resistivity curves might coincide.

Consideration of the resistivity and S.P. curves will help in diagnosing such a case. Reference to these logs will show that it is unlikely that the MicroLog does, in fact, correspond to permeable zones at these depths.

The zone from 8,500 to 8,530 ft. is also of interest. If a limestone is permeable throughout, this will be shown by the MicroLog. At the same time the S.P. peak will be more definite, and somewhat similar to that of a sand. The resistivity curve obtained with the limestone device will show normal features, however. The low-resistivity depressions in this case will indicate zones where the permeability and porosity are greater than that of the underlying and overlying rock, even though this surrounding material may itself have some porosity and permeability.

As a result of field investigation of the MicroLog it has been found that a mud cake only forms when the permeability is greater than about 0.1 millidarcies. Lower permeabilities than this will allow S.P. currents to be generated so that the MicroLog is important in differentiating between apparently permeable zones and those which have, in fact, possible commercial permeability.

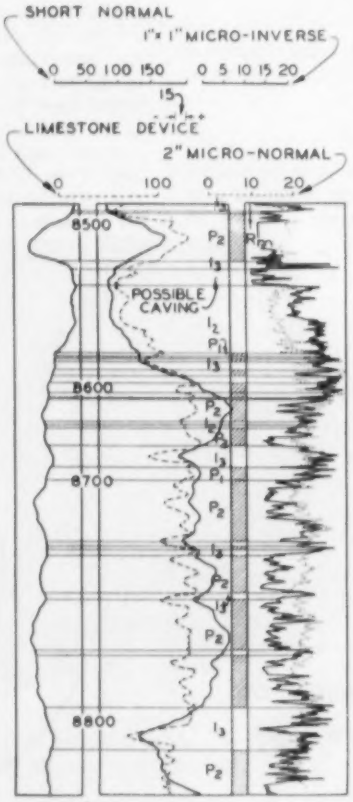


Fig. 1—MicroLog and electric log of the Ellenburger limestone where large positive separations in the upper part do not correspond to permeable beds.

Evaluating oil shows . . . In this connection the significance of oil shows while drilling and drill-stem tests which recover oil-cut mud, or small amounts of oil, should be evaluated critically. It does not require a very great volume of oil to cause such shows, or to give such drill-stem tests. Therefore, unless it is known that the limestone will respond to acid treatment, it is better to concentrate on zones which appear promising on the basis of the MicroLog.

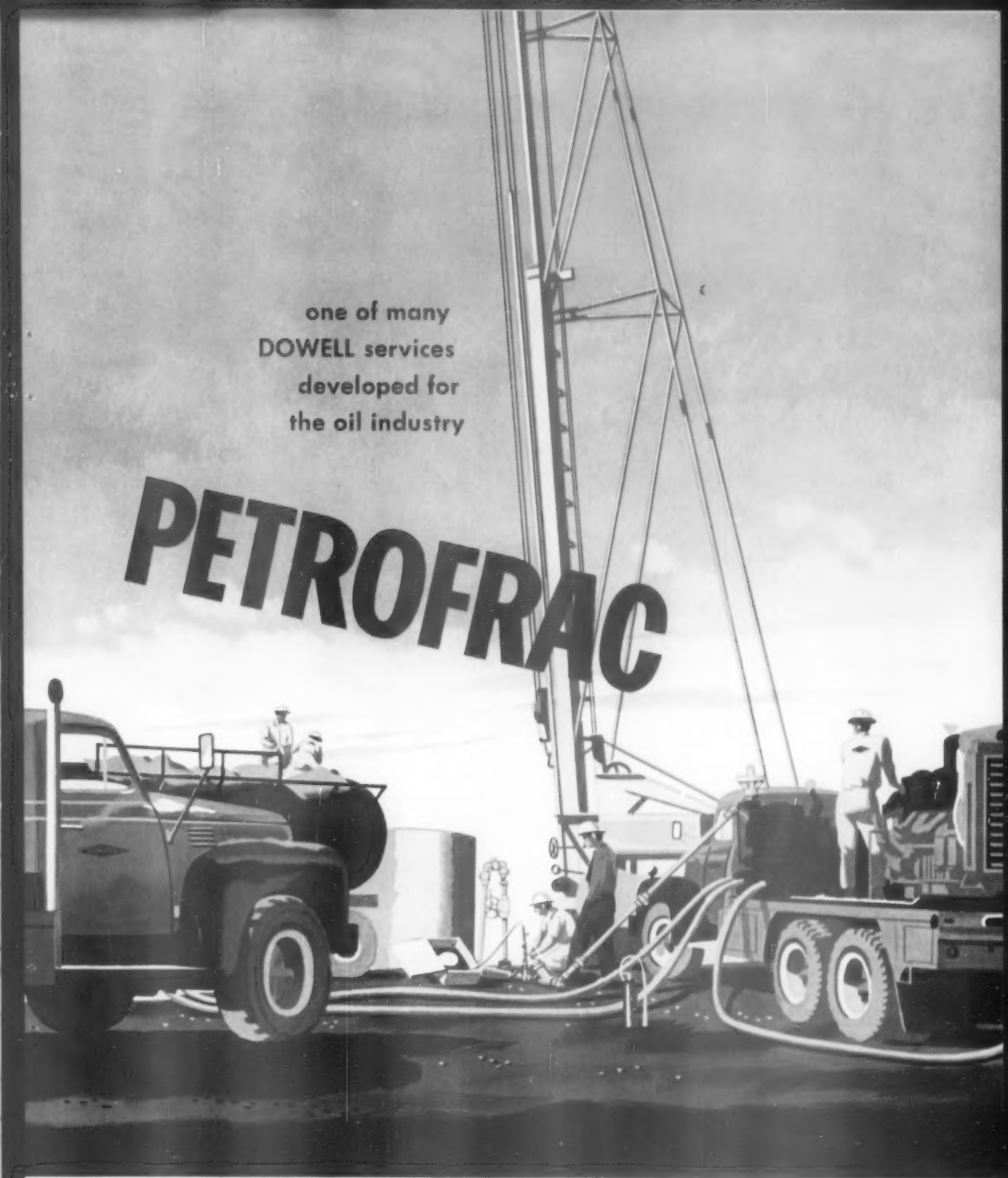
Although the thickness of the mud cake is variable, it is believed that it seldom exceeds 1 in. in thickness and with muds in good condition, may be ½ in. or less in thickness.

It has been found in practice that the resistivities recorded on the MicroLog are not always identical on succesive runs. The same general features may be recognized, however, and the separation between the curves has the same sign. Both the amount of separation and the resistivity values logged may be different. This does not prevent the same interpretation from being made in each case, but suggests that caution should be used in attempting to make quantitative evaluations of the MicroLog.

How general this lack of reproducibility may be is not known, but it requires investigation. In the general case, if a log of reasonable appearance is obtained on the first run, no other runs are made. Some overlap between successive runs with conventional devices is usual, but as intervals MicroLogged are few, such second runs through the same intervals are not made often.

Although developed as an aid in limestone logging, the MicroLog also has an application to the location of permeable zones in the more highly cemented sandstones which may not be homogeneous throughout. It has also been used in soft formations to delineate thin sands. In a general way its use for these purposes is a luxury if a reasonable interpretation may be made from conventional logs. Some examples of the use of MicroLogs for these purposes will be given later.

Author is assistant professor of petroleum engineering, Missouri School of Mines and Metallurgy.



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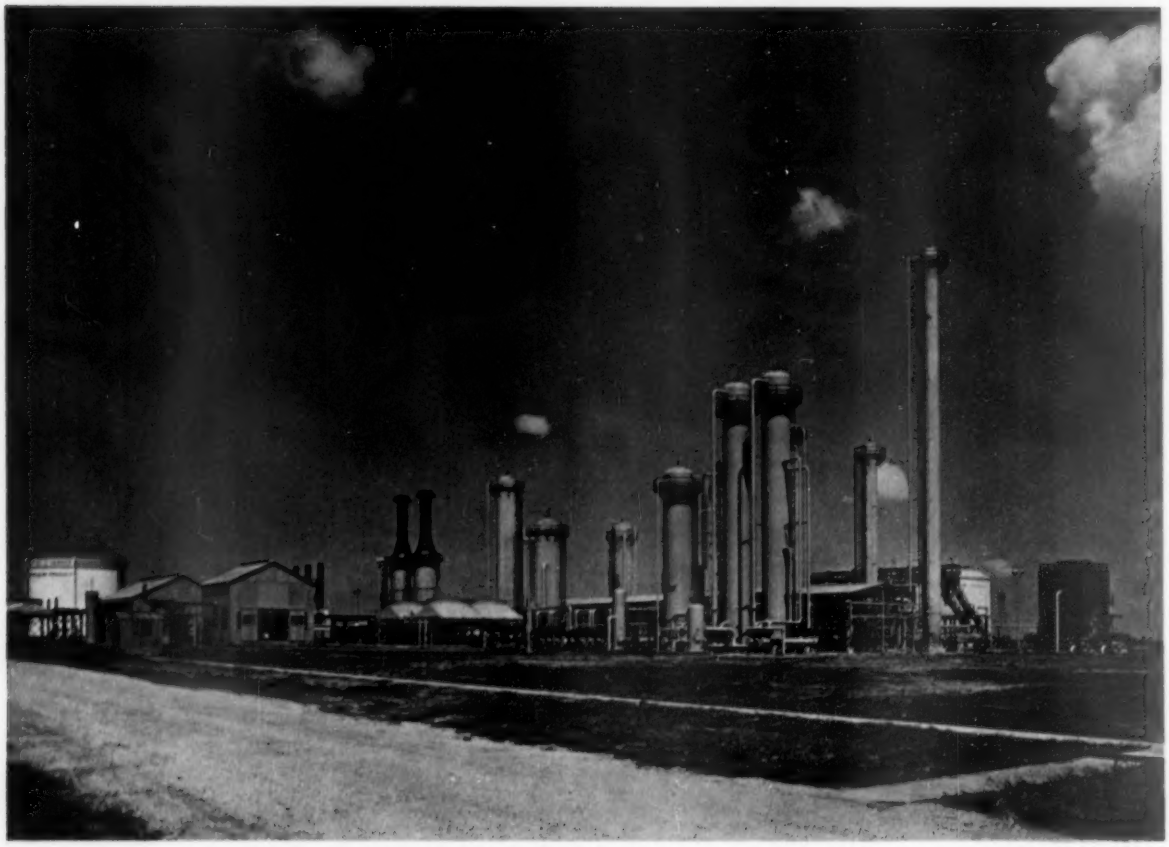

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by W. L. Nelson
Technical Editor

Application of Metals and Alloys in Petroleum Refining

Part 3

THE applications and services listed in the next several installments summarize much of the material published on the Progress in Metals page since January 1953. Compositions of the various alloys or steels listed here were published in the form of an alphabetized list in the issues of September 14, 1953-January 4, 1954.

Any listing in applications will obviously be incomplete and note especially that the most common materials such as gray cast iron, malleable iron, carbon steel, ductile iron, brasses, bronzes, etc., are seldom listed even though they may be used more widely than the alloys or alloy steels.

Equipment, Corrosive Agent or Service	Some of the Materials That Have Been Employed*†
Connecting-rod bolts (compressors)	HT 4340 steel
Convection (furnace) supports:	
Insulated or to 600° F	Gray cast iron
To 1,000° F.	Meehanite cast iron or Ni-Cr cast iron
To 1,400° F.	Scale-resisting, or Ni-Resist cast iron
Coolers—gasoline, naphtha, etc.	Carbon steel, brasses, aluminum alloys, Alclad, cupro nickel, Monel, Inconel, etc.
Copper chloride:	
Boiling	Carbon (Karbate)
Solutions	Hastelloy B and C (castings), Haveg
Cracking still tubes or vessels	(See specific corrosive service or equipment)
Crankshafts:	
Heavy duty	Cast 4340 steel
Diesel	Cr-Ni cast irons
Creep strength (1 per cent, 10,000 hours):	
1,000° F.—7,000-13,000 psi.	Carbon moly, and 2-9 per cent chromium moly steels
1,000° F.—17,000-25,000 psi.	Chromium nickel stainless steels
1,000° F.—25,000 psi.	Type 316 stainless
1,200° F.—2,000-4,500 psi.	2-9 per cent chromium moly and 13-17 per cent Cr steels
1,200° F.—6,000-18,000 psi.	Cr-Ni stainless steels
1,600° F.—2,000-4,300 psi.	19 to 30 per cent Cr steels with nickel (castings)
1,800° F.—2,500 psi.	HK 26-20 Cr-Ni steel castings
Crosshead and guides	Cast Ni-Va and 4620 steels
Crude oil or gas (sour)	Aluminum alloys, aluminum bronze, etc.
Cyclones	Carbon steel, stainless steels, etc.
Cylinder blocks	Many varieties of alloy cast irons
Cylinder liners	Many varieties of alloy cast irons
Dehydrogenation (of butane), 1,150°-1,400° F.	27 Cr irons or 27-20 Cr-Ni steel
Dewaxing (—50° to —75° F.):	
Filters, pumps, etc.	Ni-Resist castings; 1.6 Ni, 0.6 Mo cast iron; low nickel steels
Sweat pans	Aluminum or Monel, Alclad tubes
Dezincification (by water)	Antimonial or arsenical brasses
Diesel engine parts	(See specific parts or services)
Diethanolamine (DEA) condensers, coolers, exchangers, etc.	Alclad
Dowtherm:	
100 per cent concentrations at 340° F.	Carbon (Karbate)
Thermocouples for	Ni or porcelain
Ejectors	Cast iron, steel, stainless, Monel, carbon lined, Worthite, Duriron, Hastelloy A, B, and C, Haveg, Pyrex glass, etc.
Engines	(See specific parts or service)
Exchanger:	
Baffles and plates	Cast iron, steel, stainless, yellow or common brass
Shells	Cast iron, Types 502, 302 and 304 stainless and clad
Tube sheets	Steel, cast iron, Muntz metal
Exchanger tubes:	
Many services	Steel, admiralty or red brass, aluminum alloys, Monel, cupro nickel, etc.
Furfural	Aluminum alloys, Alclad
Caustic (sulfide foul)	Monel metal or 2512 steel
Sulfide corrosion	5-9 per cent Cr-Mo steels and stainless steels
Exhaust manifolds	2 Ni, 0.75 Cr cast irons
Expansion joints (heavy duty)	0.25 Mo steel
Expansion—low coefficient of	Invar and 36 to 50 per cent Ni irons (see instruments)
Evaporators	(See specific services or corrosive conditions)
Fans (flue gas recirculation):	
Blades	Type 302 or 405 stainless
Hubs	Ni-Cr cast iron
Filter cloth	Monel, Inconel, stainless steel, nickel, etc.

*Abbreviations—Type (302, 316, etc.) means A.I.S.I. designations. Q and T means "quenched and tempered." HT means "heat treated." Carb. means "carburized and case hardened." Numbers as 3140, 2335, etc., refer to S.A.E. steel designations. Chemical elements—C, carbon; Ni, nickel; Cr, chromium; Va, vanadium; Si, silicon; Mo, molybdenum; Mn, manganese.

†Obviously, plain carbon steel, cast iron, brass, etc., are used for most services and they will not always be listed. Likewise, many materials have been omitted because their use has escaped notice.

How to Design In-Tank Jet Mixing Systems—7

HERE are additional calculations for mixing TEL with gasoline as continued from the last installment. The nomogram below is the first of a group to be continued in coming issues.

(i) Pipe loss—pump and eductor discharge line, ft. 33.8

(j) Head available for nozzle (h minus i), ft. . . 61.9

(f) Maximum eductor discharge head, ft. . . . 130

(g) Static head; pump and eductor discharge, ft. 30

(h) Head available for pipe loss and nozzle (f minus g), ft. 100

(i) Pipe loss — pump and eductor discharge line, ft. 33.8

(j) Head available for nozzle (h minus i), ft. . . 66.2

14. Net excess head* (the lesser h−i), ft. 61.9

G. Use Fig. 6, knowing 4, 3, and 14, find:

15. Calculated, mixing time . . . 0 hours, 28 minutes.

*This MUST be greater than 13.

(Remaining calculations continued in the next installment.)

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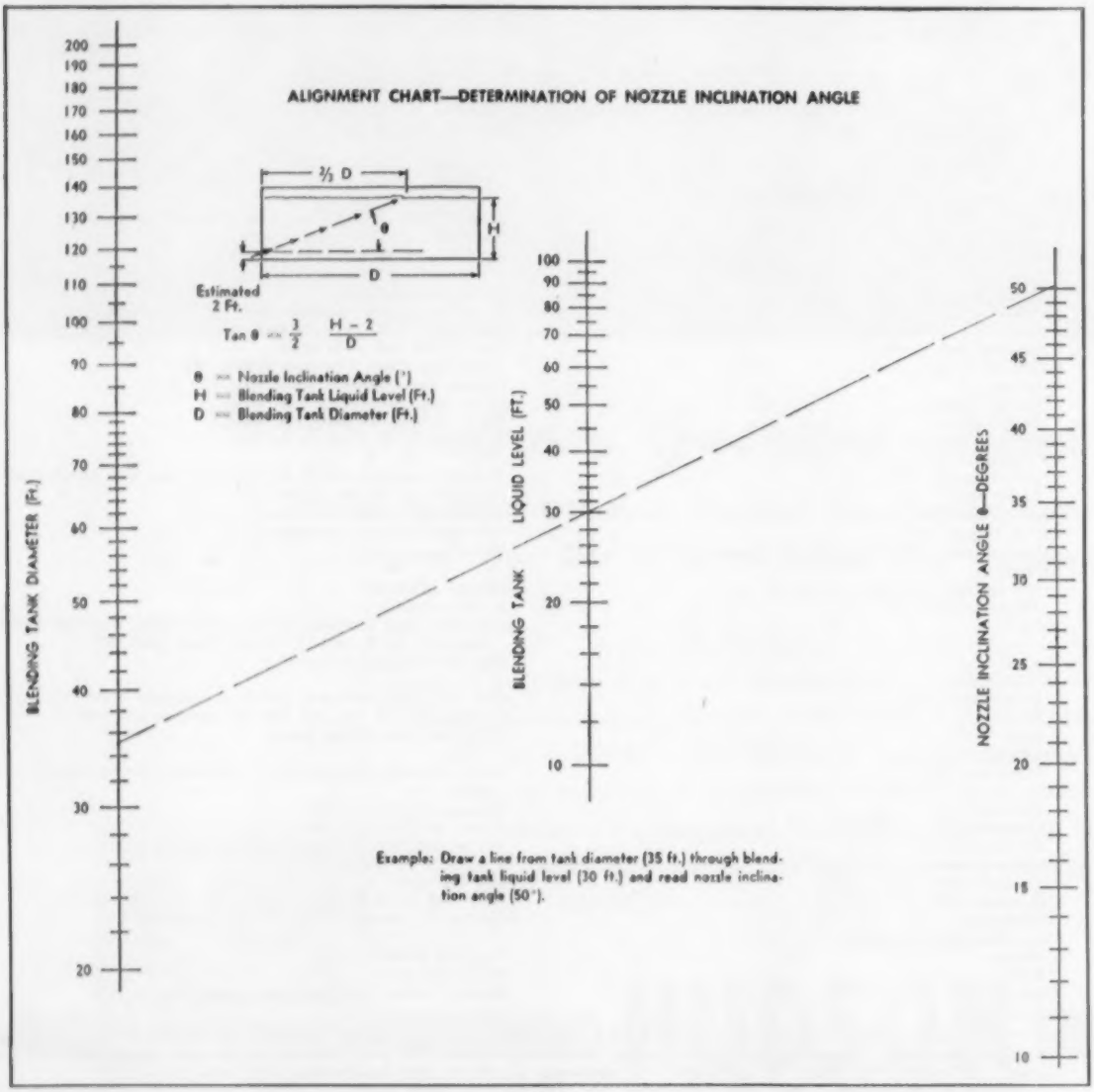

ALIGNMENT CHART—DETERMINATION OF NOZZLE INCLINATION ANGLE
⅔ D
H
θ
D
Estimated 2 Ft.
Tan θ = 3/2 (H − 2)/D
θ = Nozzle Inclination Angle (°)
H = Blending Tank Liquid Level (Ft.)
D = Blending Tank Diameter (Ft.)
BLENDING TANK DIAMETER (Ft.)
BLENDING TANK LIQUID LEVEL (FT.)
NOZZLE INCLINATION ANGLE θ—DEGREES
Example: Draw a line from tank diameter (35 ft.) through blending tank liquid level (30 ft.) and read nozzle inclination angle (50°).

Fig. 3.

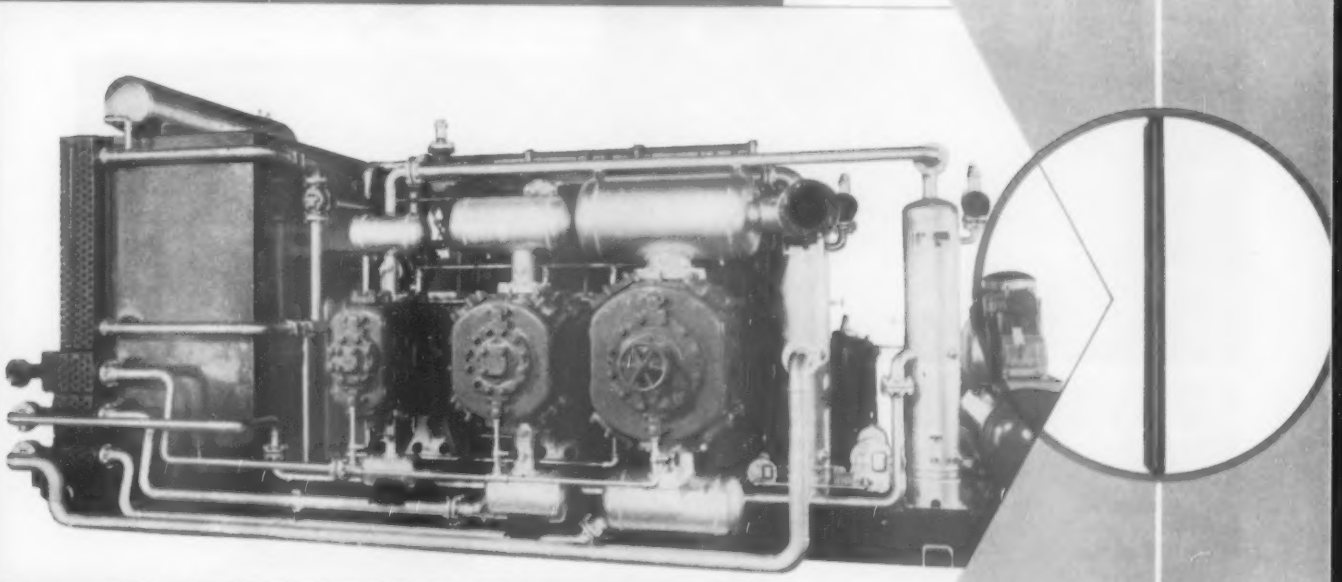
Southwest

PACKAGED COMPRESSOR PLANTS

Cooper-Bessemer

GMXA V-Angle Gas Engine-Driven Compressor

ESSENTIAL FOR GAS LIFT



Every gas lift installation is engineered specifically for one particular well. Every Southwest Packaged Compressor Plant is likewise individually engineered. Southwest power brings the long life and low maintenance of an integral, complete compressor plant to the well head. The rugged design and low RPM of the Cooper-Bessemer GMXA V-Angle Gas Engine-Driven Compressor means you'll keep on producing without losses from repairs, replacing belts, etc. Each Southwest plant is complete and ready to go weeks ahead of conventional units. Available in sizes from 200 horsepower.

SOUTHWEST INDUSTRIES, INC.

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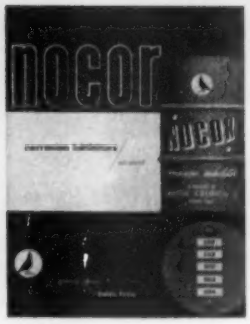
a new day has dawned in the field of corrosion control. Dollars once wasted now can be invested in new equipment or development — or saved as profit.

After more than three years of continuous research, Cardinal chemists recently succeeded in producing an organic inhibitor which far surpasses any similar product in the reduction of corrosion in producing oilwells.

We believe Cardinal's new Nocor "103" is the first inhibitor to prove the theory of "a close-packed monomolecular layer of film impermeable to corrosive ions." Repeated field tests prove beyond doubt that the new Nocor affords protection unheard of not many months ago. In fields of notoriously high corrosion failure — in wells both sweet and sour — Cardinal's new Nocor "103" has exceeded the highest hopes.

Available not only as a liquid, but also as weighted sticks and in combination with emulsion breakers, the new Nocor (103, 302, 303, 503, 604) *has turned the corner.* No other inhibitor compares with the new Nocor in its effectiveness. In our opinion, these new Nocors represent the corrosion engineer's farthest advance in the search for control over corrosion in producing oil wells and in other, special applications within the industry.



A new 12-page booklet just off the presses tells the full story. It is written by chemists in the layman's language. Graphs and charts show why and how the new Nocor is the closest man has yet come to complete and perfect control over corrosion in producing oil wells, refineries, pipelines, etc. This booklet is yours for the asking. Write today.

CARDINAL CHEMICAL · INC.

Home Office ODESSA · TEXAS Box 2049

Drilling Contractors

Wise Drilling Co., Tyler, Tex., has a rig running on a wildcat location 4 miles north of Frankston, in Henderson County, East Texas. It is a contract job for Sorelle & Sorelle and K. Hughes, of Houston. Location is for 1 Swancy, in the Geliher Survey. Objective is around 5,500 ft.

Carter Drilling Co. has contracted for a 7,600-ft. Mesaverde test to be drilled for U. S. Smelting, Refining & Mining Co. in the North Lake Creek area of Moffat County, in northwestern Colorado. Location is on government land, in 13-8n-93w.

Sutton Drilling Co., San Antonio, has a rig working at a wildcat location 11 miles northwest of Giddings, in Lee County, Central Texas. It is a contract job for W. J. O'Rourke. Location, 1 Falke, in the James Hudson Survey, is 2¼ miles east of the McDade area. Hole is projected to 5,000 ft.

Hayden Farmer is contractor on a new wildcat test Bill R. Tipton, of Marshall, Tex., is putting down 1 mile northwest of New Summerfield, in Cherokee County, East Texas. Location is for 1 Gill, in the William Gates Survey. Contract is for 4,600 ft.

H. & H. Drilling Co., Wichita, Kans., is drilling on a contract with United Production Co., Inc., at a rank wildcat location in western Hamilton County, western Kansas. The test, 1 Helfrich, in 6-25-42, is projected to the Mississippian, around 5,600 ft. Location is 12 miles southwest of Syracuse, 4½ miles from the Colorado line, and 20 miles from nearest production.

On the floor of a rig H. L. Rowley, Inc., Shreveport contractor, is operating for Southern Natural Gas Co., of New Orleans, on a deep outpost test in the Plumb Bob area of St. Martin Parish, Louisiana Gulf Coast: Gillis Windham (left), Rowley driller, and Oscar Lyons, field superintendent for the operating company.

Barnwell Drilling Co., Shreveport, is under contract for a rank wildcat test to be drilled for States Oil Co., of Shreveport, in southern White County, Central Arkansas. The test, 1 LaFerney, in 25-6n-8w, is contracted to the top of the Mississippian, or 5,000 ft. Location is 10½ miles southwest of Searcy.

Milton Crow, Inc., Shreveport, has a new operation under way for Benedum-Trees Oil Co. in the Kiblah area, southwestern Lafayette County, Arkansas. It is a 6,500-ft. test to the Pettit horizon at 3 Caldwell & Lowe.

Falcon Seaboard Drilling Co., Tulsa and Houston, has another operation under way for Cities Service Oil Co. in the new north extension area at Fausse Pointe, in Iberia Parish, coastal Louisiana. It is the company's 3-B Mestayer, in 27-11s-8e, projected to 8,800 ft.

Henry Gist will be the contractor on Mobil Producing Co.'s projected deep wildcat test in the Bearcat area of northern Park County, in the Big Horn basin, northwestern Wyoming. The test located in 13-56n-100w, will be carried through the Phosphoria around 9,800 ft.

Rebstock & Reeves Drilling & Well Service Co., New Orleans, has been awarded contract by Shell Oil Co. for another deep well in the Dixon Bay area, in the Mississippi River Delta, Plaquemines Parish, Louisiana. The well will be the second for Shell, and is listed as 2-B State Lease 1388, with location in 24-23s-31e. It is projected to 9,100 ft.

J. C. Chance Drilling Co., Houston, is scheduled for a deep test (approximately 11,100 ft.) to be drilled for Sun Oil Co. at 1 Dailey, in 59-7s-4e, on the east side of Shuteston field, in St. Landry Parish, southern Louisiana.

Sunnyland Contracting Co., Rayne, La., is under contract to Humble Oil & Refining Co. for a 6,500-ft. Wilcox test to be drilled at a wildcat location in northern Adams County, southwestern Mississippi. Location is for 1 Marshall, in 17-7n-2w. It is about 3 miles northeast of Natchez. Sunnyland also has the

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INDIANA

contract for a new Wilcox well which Humble is starting in Shieldsboro field, in the southwestern part of the county. Contract is for 7,000 ft. at 2-B Hamilton.

Glasscock Drilling Co., Shreveport, has taken on a contract for a projected 13,000-ft. wildcat test to be drilled for Michel T. Halbouty in Assumption Parish, Louisiana Gulf Coast. Location is Lake Verret, about 3 miles northwest of East Lake Verret field, in the western part of the parish.

Parker Drilling Co., Tulsa, is doing the drilling on the projected 13,500-ft. wildcat test Rotary Development Corp. and Humphrey Oil Corp., of Dallas, are starting 9 miles north of Chickasha, in Grady County, Oklahoma. Location is for 1 Coleman-Davis, in 20-8n-7w.

Guy R. Smith, Stephens, Ark., is putting down a 4,000-ft. Travis Peak test 1¼ miles southwest of Falcon field, in northwestern Lafayette County, southwestern Arkansas. It is a contract job for Murphy Corp., El Dorado, Ark., at 1 Kitchens, in 17-15s-22w. Smith is using a rig leased from W & W Drilling Co., Lewisville, Ark.

Henderson Drilling Co., Longview, is drilling on a projected 4,500-ft. sub-Clarksville test 7 miles southwest of Pittsburg, in Camp County, northeastern Texas. The test, 1 Freeman, is a joint operation with John C. Robbins, Jr., with Henderson's tools under contract.

Dorris Ballew, Inc., Natchez, Miss., is under contract to R. A. Campbell, of Vidalia, La., for two additional wells in Bee Brake field, western Concordia Parish, eastern Louisiana. Both wells are projected to the Wilcox pay around 7,000 ft. They are listed as 1 Campbell-Magoun and 1 Campbell-Pasternack-Dale. Locations are in 16-4n-7e.

Pegg Brothers Drilling Co. is drilling for C. G. Mitchamore and Julius H. Blum, of Houston, at a wildcat location 2 miles east of Floresville, in Wilson County, Southwest Texas. The test is carried as 1 Durrett. Hole is projected to 3,400 ft.

Hagestad Drilling Co., Bakersfield, Calif., has the contract for a 5,000-ft. test E. L. Doheny is undertaking in the Buena Vista Ranch area, 5 miles northeast of Tupman, in Kern County, California. Location, on the operator's Kern County Land Co. lease in 9-30-25, is 2 miles northwest of Canal field, which produces from the Stevens sand around 8,000 ft.

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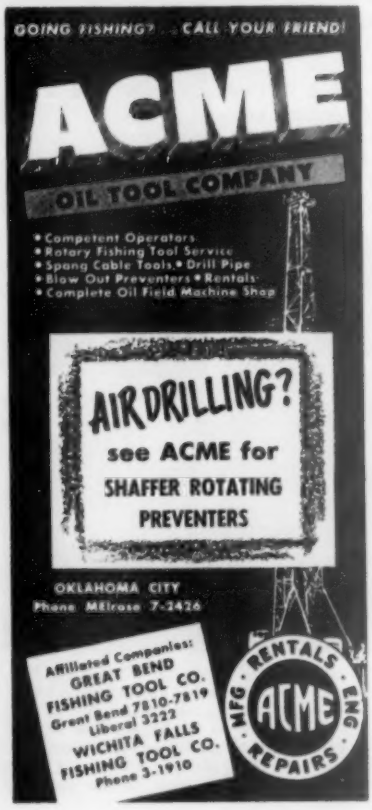

REFINING

Sunray Sells Plant

Union acquires 5,000-bbl. refinery at Santa Maria

TULSA.—Sunray Oil Corp., of Tulsa, has sold its 5,000-bbl. asphalt and products refinery at Santa Maria, Calif., and its crude production in the adjacent area to Union Oil Co. of California for an undisclosed sum.

The heavy crudes produced in the Santa Maria area are readily adaptable for processing at the new coking plant which Union is building near Santa Maria.

Union officials said that the company would continue to operate the refinery. They also stated that former Sunray employes would be offered jobs under Union's management.

All asphalt products manufactured by the refinery have been bought under a long-term contract by K. D. Ford Petroleum Co. Ford said that his newly formed company would fulfill all of Sunray's existing asphalt sales commitments.

Sunray will continue its operations in California as an exploration and production company. The company now has refineries at Duncan and Allen, Okla. The Duncan refinery is considered the firm's major refining operation.

Oklahoma Mississippi River Products, Inc., a subsidiary of Sunray, completed a products line this summer from Duncan to Fort Smith, Conway, and West Memphis, Ark., where Sunray markets its products.

Refinery Output Increased

DENVER.—Oriental Refining Co. has increased the output of its crude distillation unit here by 16 per cent by using a newly developed oil heater to reheat reduced crude up to 780° F. for reprocessing.

Oriental officials reported the operation was giving the company nearly $100 a day extra in salable products.

When the reduced crude is pumped into the steel coils of the heater, its temperature is raised from 630° to 780° F. The crude is then pumped back into the crude distillation.

Fuel for the heater, which is slightly larger than a household refrigerator, is uncondensed gas from one of the refinery's thermal cracking units.

The heater is similar to the steam generators used by railroads to make steam for diesel-powered passenger trains. The steam generators are also mounted on trucks and used in oilfields to produce 600-lb. steam for cleaning paraffin out of pipelines.

Shell Platformer Finished

WOOD RIVER, Ill.—Shell Oil Co. has gone on stream with a 16,000-bbl. Platformer at its refinery here. The company already operates a 5,000-bbl. Platformer at its Martinez, Calif., refinery, and a 16,000-bbl. unit at its Houston plant.

The large unit at Wood River is essentially a duplicate of the one at Houston. It processes naphtha derived

SMOG CONTROL was one of the major topics discussed by the Smoke and Fumes Committee of American Petroleum Institute headed by W. L. Stewart, Jr., Union Oil Co. of California. Shown addressing the group is Howard G. Vesper, Standard Oil Co. of California. The group met during the recent A.P.I. meeting in Chicago.

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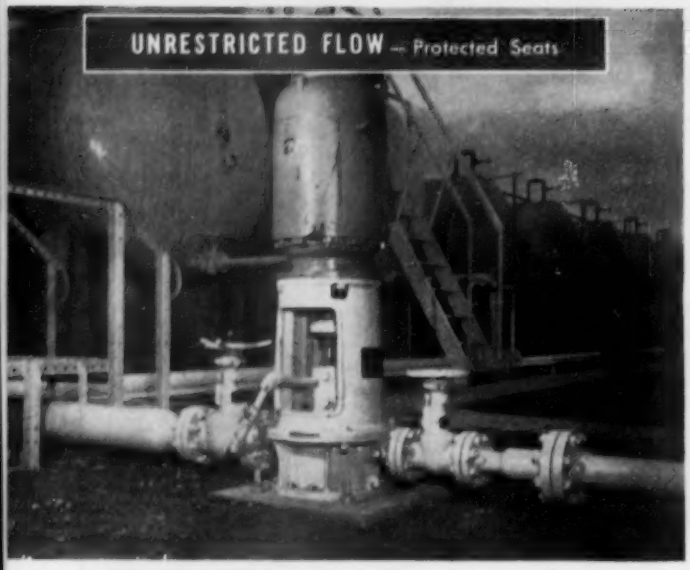
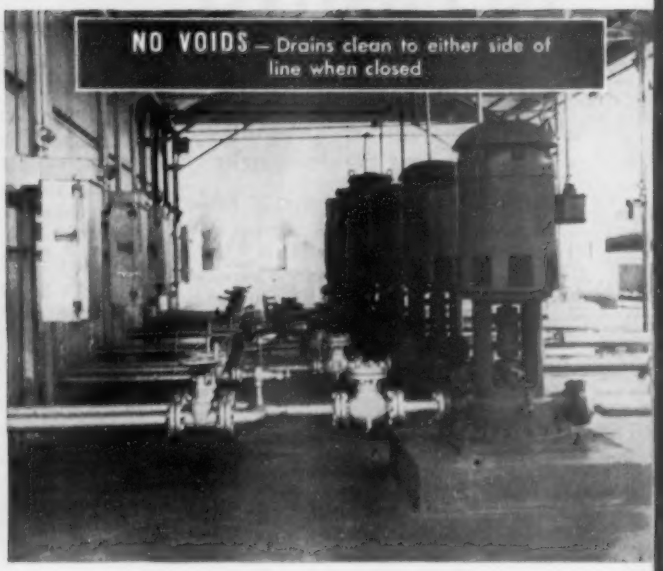
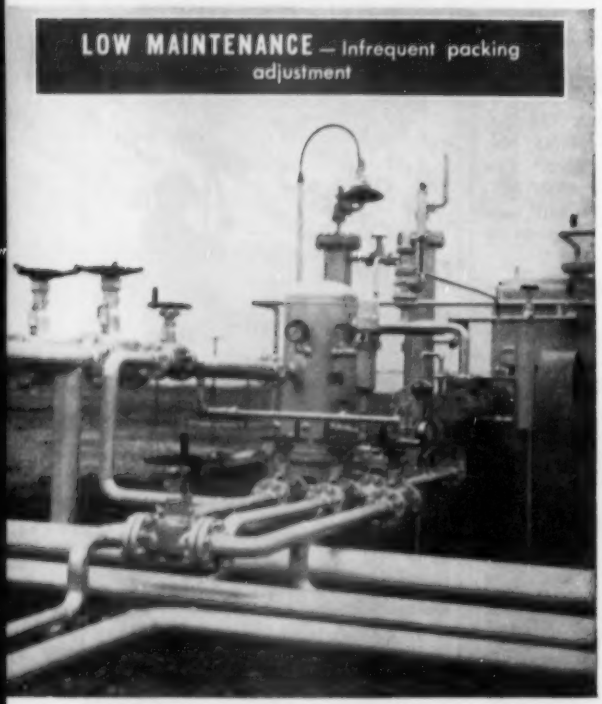


Centrifugal Pump on Products Line to Surface Storage. Flow characteristics are important. Orbit full opening valves provide straight through flow.



LP-Gas Loading Pump Manifold. Fluids cannot be trapped in the valve body either open or closed. Another Orbit safety feature.



Propane Treaters & Dehydrators. A minimum of attention results in lower maintenance costs.

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ORBIT *forged steel* LP-Gas (A.S.A. Class) VALVES offer many more advantages. Besides being a modern streamlined valve that is compact in design yet rugged, it is competitively priced and meets A.S.A. face to face specifications. No lubricant is required to effect a seal thus ORBIT forged steel valves require an absolute minimum of expense and attention. Contraction, expansion or vibration will not cause the seating surface to separate in the closed position.

ORBIT *forged steel* LP-Gas VALVES are offered equipped with two distinctly different body seats at no extra cost to the customer. Our Buna-stainless Type "B" body seat is recommended for handling aliphatic hydrocarbons, aliphatic alcohols, anhydrous ammonia, water, salt water, crude oil, vegetable oil and animal oils. Our Type "C" stainless-asbestos

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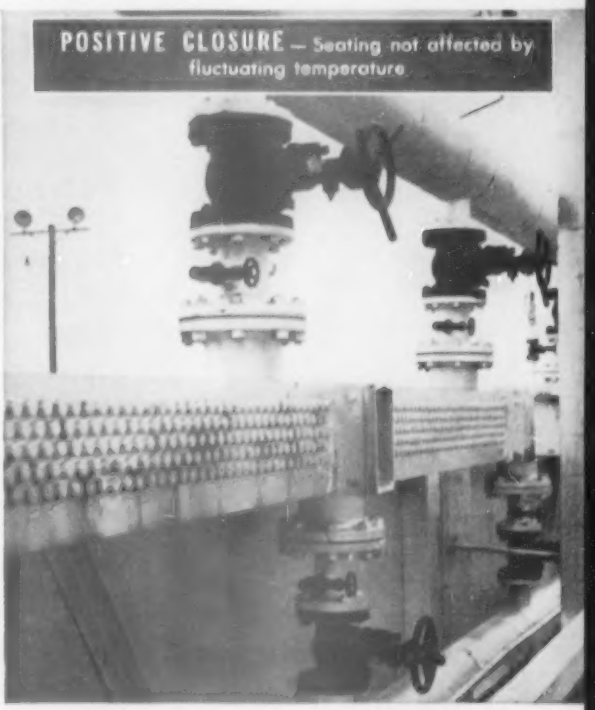
Iso-Butane Coolers. Valves must work when needed. Orbit Valves friction free core and seating provide ease of operating and no sticking.

Suction & Discharge – Propane & Water Lines. Mistakes can be costly. The Orbit rising stem feature shows at a glance whether the valve is opened or closed.

. About ORBIT VALVES

body seat is also recommended for the above services plus aromatic hydrocarbons, chlorinated hydrocarbons, esters, aldehydes, amines, aromatic alcohols, ketones, ether, anhydrous ammonia, salt water, water. *If possible please specify service when ordering or write us for further detailed recommendations.*

ORBIT *forged steel* LP-Gas VALVES are rated 250° Fahrenheit maximum working temperatures. Sizes: 2″, 2½″, 3″ and 4″, 300 lb., 600 lb., 900 lb., 1500 lb., 2500 lb. A.S.A. Class screw or flanged end. Venturi Orbit Valves are offered in 150 lb. class, sizes 2″, 2½″, 3″ and 4″. 300 lb. class size 6″ only. 600 lb. class size 6″ only. 1½″ and 2″ are offered in 1500 and 2500 lb. class. All sizes listed furnished in either carbon or stainless trim.



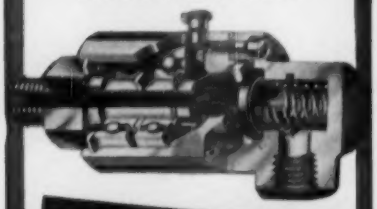
De-Iso Butanizer Overhead Condenser. The Orbit Valve resilient seating principal insures positive closure even though temperature changes may occur.

ORBIT VALVE COMPANY

P. O. BOX 699 **TULSA, OKLAHOMA**

REDUCE

"Down-Time" and Maintenance



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Starting and running torque held to constant minimum through balanced sealing and two single row, sealed-for-life ball bearings. This permits higher operating speeds.

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Light weight, yet built for long trouble-free performance.

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Only the seal faces are expendable. Easily replaceable on the job.

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Maximum speed, 3500 r.p.m. Maximum pressure, 150 p.s.i.

Ask your local supply store for details and prices.

Get the facts about the new Deublin CHATTER-PROOF Quick-Release Valve

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from mixed crudes, which boils in the range of 190° to 360° F. The unit operates only for the production of motor fuel-blending material and produces a 95 leaded-octane Platformate.

Universal Oil Products Co., Des Plaines, Ill., designed, engineered and licensed the unit. Procon, Inc., was the contractor.

Lube Plant Progressing

EDMONTON.—Despite one of the wettest construction seasons in recent years, work is progressing rapidly on the Imperial Oil, Ltd., $15,000,000 lubrication plant on Edmonton's eastern outskirts.

About 500 workmen are rushing to complete the pouring of concrete and to close in the walls of buildings so interior work and installation of equipment can continue during the winter.

Work on the plant started early in July. It is expected to be completed by September 1955.

The general contractor is Canadian Kellogg Ca., Ltd. In charge of the project are W. R. Stevenson, Imperial Oil resident engineer at Sarnia; Adolph Fink, of Grove, Okla., resident construction manager; and J. C. Beckheyer, assistant construction manager.

The plant will have a capacity of 2,000 bbl. per day and will manufacture 55 different kinds of automotive and industrial lubricating oils.

Petrochemicals

Deere On Stream

Company enters chemical field with ammonia plant

PRYOR, Okla.—Grand River Chemical Division of John Deere & Co. has gone on stream with an $18,000,000 ammonia and urea plant here.

The plant, which marks Deere's entrance into the chemical field, will have a design daily capacity of 180 tons of ammonia and 260 tons of urea. The plant features a relatively high degree of process integration, reduced equipment size, and extensive automatic control.

Foster Wheeler designed the units and also served as general contractors. The company will use the Casale process for ammonia synthesis, operating in the neighborhood of 12,000 psi., and the Pechiney process to make urea.

Use of the Casale process, which is new in the United States, will enable Deere to utilize water cooling for ammonia condensation and will eliminate auxiliary refrigeration required at lower pressures.

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THE TORCOME DFL Gas Separator and Flow Nipple is a field-tested production unit, designed to aid the operator of pumping wells. It is installed in the flow line near the well head to provide clean, dry gas for the engine from the oil being produced. Where applicable, it eliminates fuel purchases, gaslines, drips and scrubbers.

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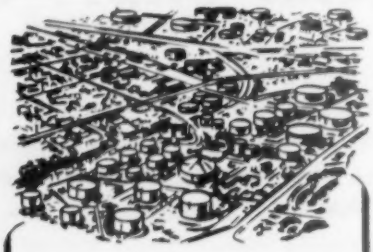

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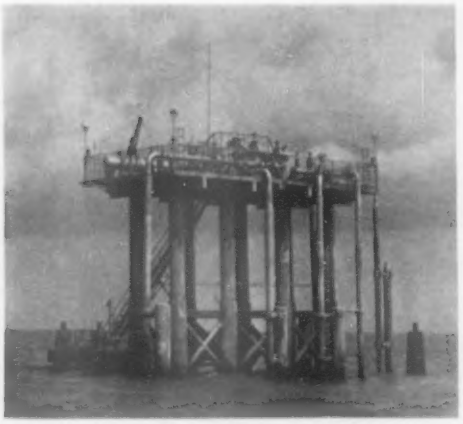
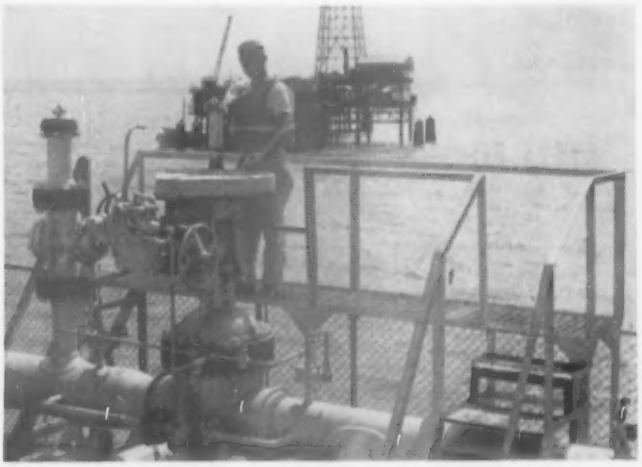


WORK SITE . . . This platform, one of four in an extensive offshore pipeline system, is 40 miles from Morgan City, La.

GETTING THERE . . . This crew boat transports United's pipeline crew on the 3-hour trip from the mouth of the Atchafalaya River to Block 32, some 10 miles out in the gulf.

GETTING ABOARD . . . It may look easy here, but landing men on this platform from a small boat can be mighty risky when a high sea is running.



CHECKING EQUIPMENT . . . Corrosive salt air causes rapid deterioration and equipment failure, so equipment checking and maintenance like this is vitally essential to operation.

Sea-going pipeliners at work

. . . they operate a pipeline network miles out at sea

YOU would hardly think of the Gulf of Mexico as a place for pipeliners, but several employes of United Gas Pipe Line Co. work there regularly. Their job is to operate and maintain equipment connected with the network of 10 to 20-in. pipelines laid on the bottom of the gulf off the Louisiana coast. The system itself is one of the principal supply sources for United's big 30-in. main line which runs from South Louisiana up to Kosciusko, Miss.

Laying of this underwater pipeline system, which comprises more than 27 miles of line, was a feat in itself. Operating and maintaining it is another.

Built in 1951 . . . Construction of the system in 1951 still stands as an outstanding achievement of modern-day pipelining. The 20-in. line—from the shore of St. Mary Parish out to Block 32 in Eugene Island area—was built of pipe with ¾-in. steel walls. It was enclosed in heavy jackets of Somastic and concrete, and was the first large-diameter line ever laid under the gulf.

The terminal for this 20-in. section is on a big steel and concrete platform standing in Block 32. This platform serves as a junction for all the offshore facilities. It is from this point, about 15 miles due south from Point Chevreuil, that the company's 10 and 14-in. lines stretch out to connect the various producing platforms of oil companies operating in the offshore area.

Two 14-in. lines run to Pure Oil Co.'s A platform where the original gas discovery was made in Block 32 and from which five producing wells now feed into United's system. A 10-in. line was recently completed, running to Pure's D platform 1,200 ft. away, on which two wells have been

See Composite and Refinery Catalogs, or Write for Specifications Folder

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Shreveport, La.

PIPELINE PATROL

CHANGING CHARTS . . . Twice a week, all charts on gas measurement equipment are changed by United pipeliners. They service Pure's Block 32 structures as well as one of Sun Oil's and one of Magnolia's.

completed and where drilling is continuing. A 10-in. line connects Sun Oil Co.'s Block 33 platform 1¼ miles to the east, where one well is putting gas into the United system.

Maintenance . . . Taking care of the more than 27 miles of underwater pipeline system requires plenty of marine equipment. United calls its men "seagoing pipeliners," and truer words were never spoken.

Two mornings a week, at 7 o'clock, a crew boat starts out on a 100-mile round-trip journey from Bayou Boeuf at Morgan City. Moving down the Atchafalaya River, it enters the open gulf and heads for Block 32.

After a trip of about 3 hours, the boat ties up at the A and D structures in Eugene Island area while the pipeliners go topside to change charts on the gas-measuring equipment at the purchase-meter stations. Then the boat heads east-northeast to Sun Oil Co.'s Block 33 platform 1¼ miles away. Here another change of charts is made. The boat then carries the pipeliners on out to Magnolia's platform, 50 nautical miles from Morgan City, for the last pickup before turning toward port.

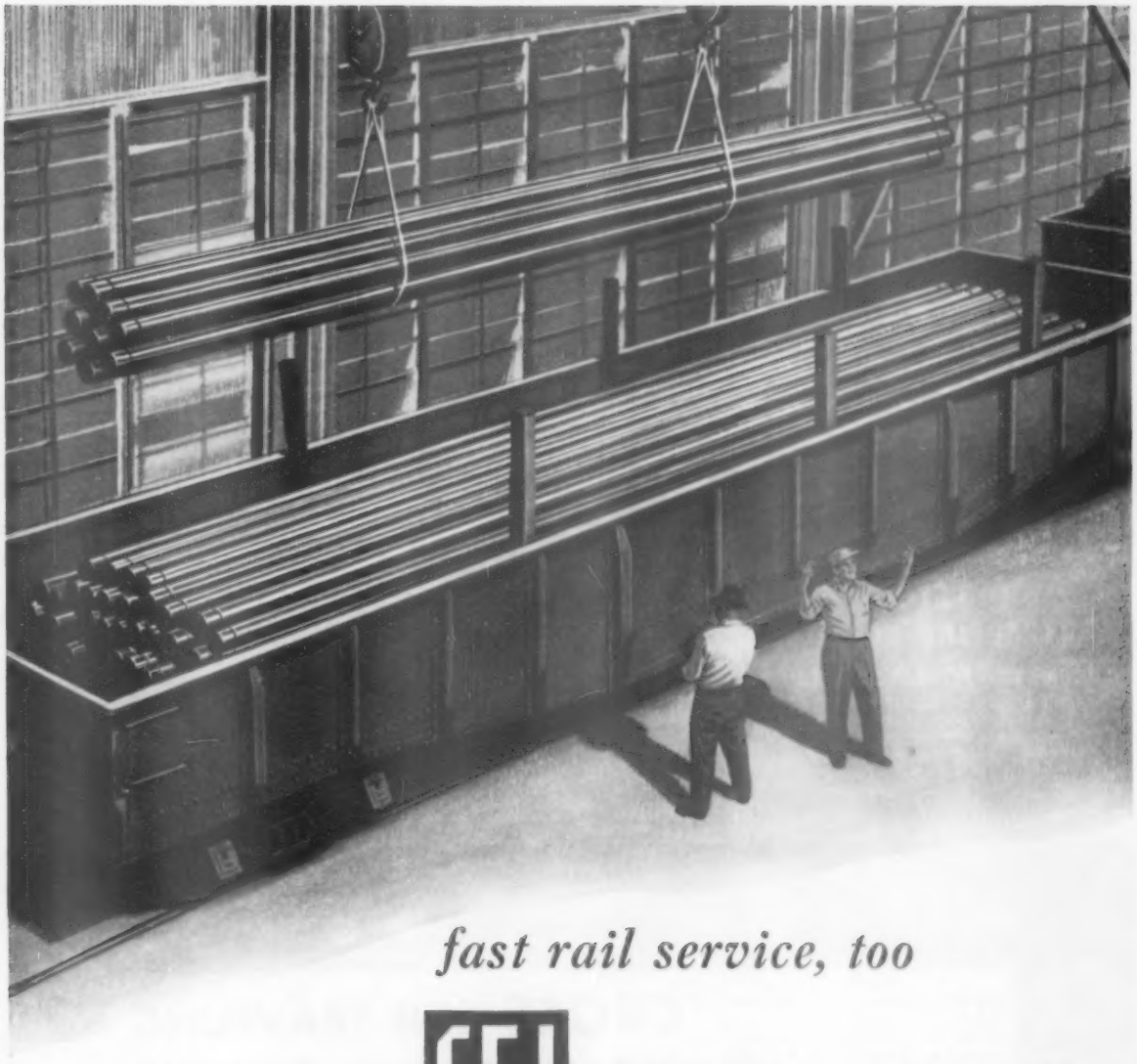
These charts must be changed semiweekly, but each trip is considered all in a day's work for United's pipeliners.

FINAL CHECK . . . Obstruction warning lights on each offshore platform are checked each trip. A light failure would create a serious navigational hazard.

New drilling . . . Pure Oil Co., an offshore veteran, recently began drilling operations from a new location in Block 32 which is scheduled to provide an additional gas supply for United's nearby facilities. This newest structure, from which the first well is now being completed, is known as platform E. It is about 1¼ miles southeast of the company's D platform.

The longest supply line under water in this area is a 14-in. line extending farther seaward to reach production properties of Magnolia Petroleum Co. This line runs about 10½ miles from Block 32 to Magnolia's Block 51 platform.

United has installed purchase-meter stations on each of the platforms in Blocks 32, 33, and 51 to measure volumes delivered. Liquid-extraction equipment is maintained by the producing companies to remove water vapor and separate liquid hydrocarbons produced along with the gas.



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An extensive network of railroad lines is reached from Pueblo, Colorado, home of the new CF&I Seamless Tube Mill. Combined with facilities for motor truck haulage, this means that whether by rail or over-the-road, we are in an ideal position for quick and economical shipment to all points in the Western oil country.

Whenever you're out this way, we'll be happy to take you through our new mill—most modern of its kind in existence. Better than anything we can say, your visit will show you how our advanced production equipment is your assurance of quality casing and tubing.

CF&I Seamless Oil Country Casing and Tubing are available in sizes from 2⅜" O.D. through 9⅝" O.D.—meet API STD 5A specification.

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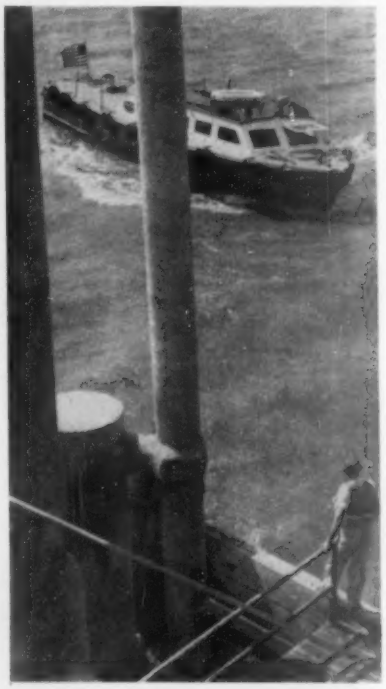
PIPELINE PATROL

Supply lines . . . A number of supply lines meet on top of United's platform, each feeding its gas into the 20-in. main line for delivery shoreward to the Burns station. This station is about 3 miles inland from the coast, and here connection is made with United's mainland facilities.

In the 2½ years since the original offshore facilities were put in service, delivery into the Burns station has increased from 20,000,000 cu. ft. daily to the current daily volume of about 100,000,000 cu. ft. The duties and distances have also increased for pipeline personnel at United's semimarine operating headquarters at Morgan City, La.

Since October 31, 1951, when initial deliveries of offshore gas were made, the operating record of the facilities has been outstanding. United reports that there has not been a single line break nor have there been any unscheduled interruptions of service of any kind. This, the company feels, is a tribute to the men who designed and built the history-making offshore gas system. It reflects a high degree of credit on the men of United who double as seamen and pipeliners while watching and maintaining the facilities year 'round.



HOMEWARD BOUND . . . With all four platforms checked, the day's work is done—and this pipeliner gets set to head for home in the crew boat.

Model CFF—for 2" to 8" pipe.
Model M —for 3" to 14" pipe.
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Model R —for 30" to 31" pipe.

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The most rugged and dependable cleaning and priming machine on the line . . . equipped with dual multi-speed transmissions providing greater flexibility of control. Interchangeable cleaning and priming assemblies permit each model to process a wide range of pipe sizes.

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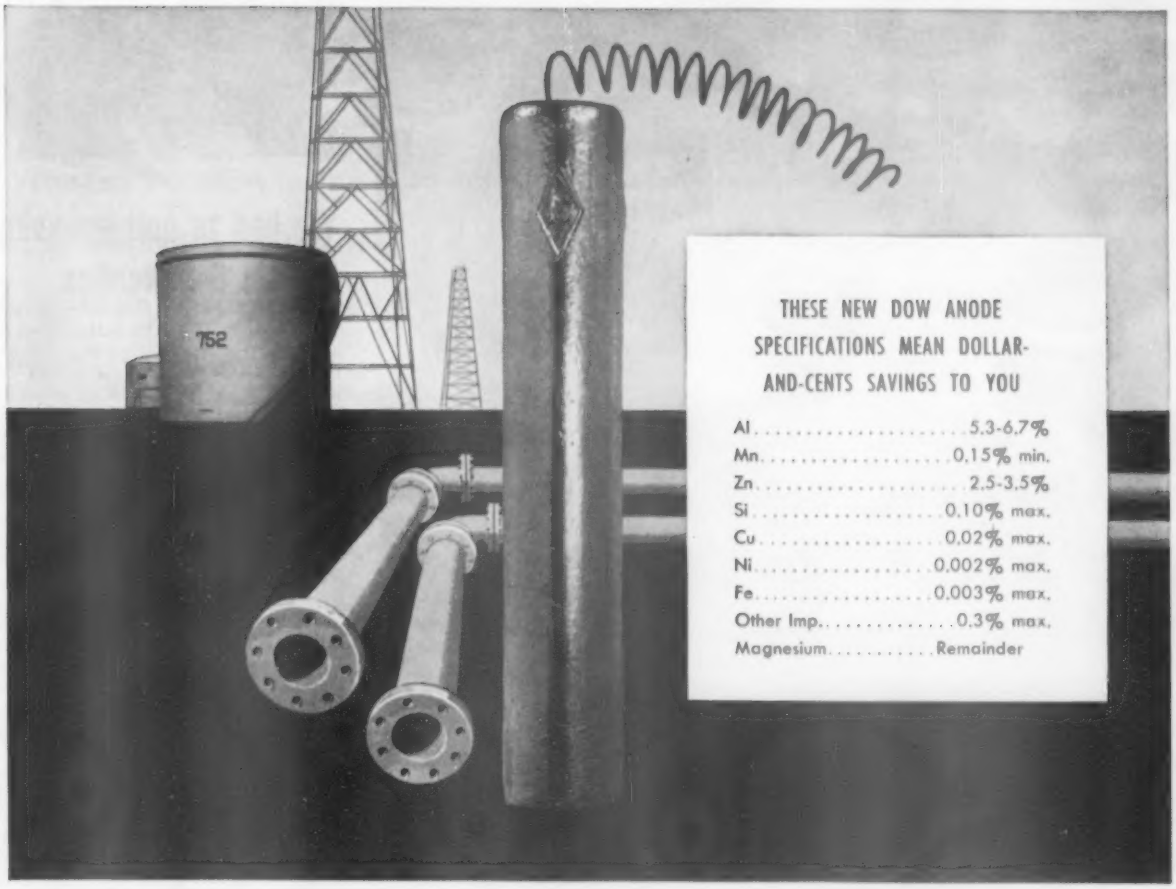

New high purity Dow Magnesium Anodes give you more hours of cathodic protection per dollar than any previously available

Cost of cathodic protection is now sharply reduced, thanks to new *high purity* Dow magnesium anodes. Because common impurities that cut efficiency have been greatly diminished, the new Dow anodes last far longer and give you more ampere hours of protection.

That means less frequent replacement—major savings in labor as well as in the anodes themselves.

Dow's new specifications for *high purity* magnesium anodes result from some 1,200 individual anode efficiency tests, covering more than 120 batches of magnesium alloy. Ample field testing, under varied conditions, has proved the findings of the Dow magnesium laboratories.

Now available in the complete range of shapes and sizes of cast anodes, the new *high purity* anodes represent another important step in Dow's continuing program of magnesium research and development.

If you have an underground corrosion problem, Dow magnesium anodes offer the truly dependable solution—unaffected by power line failure or dried-up ground beds. Phone your nearest Dow sales office or distributor of Dow anodes for full details. THE DOW CHEMICAL COMPANY, Midland, Michigan, MA 314J-2.

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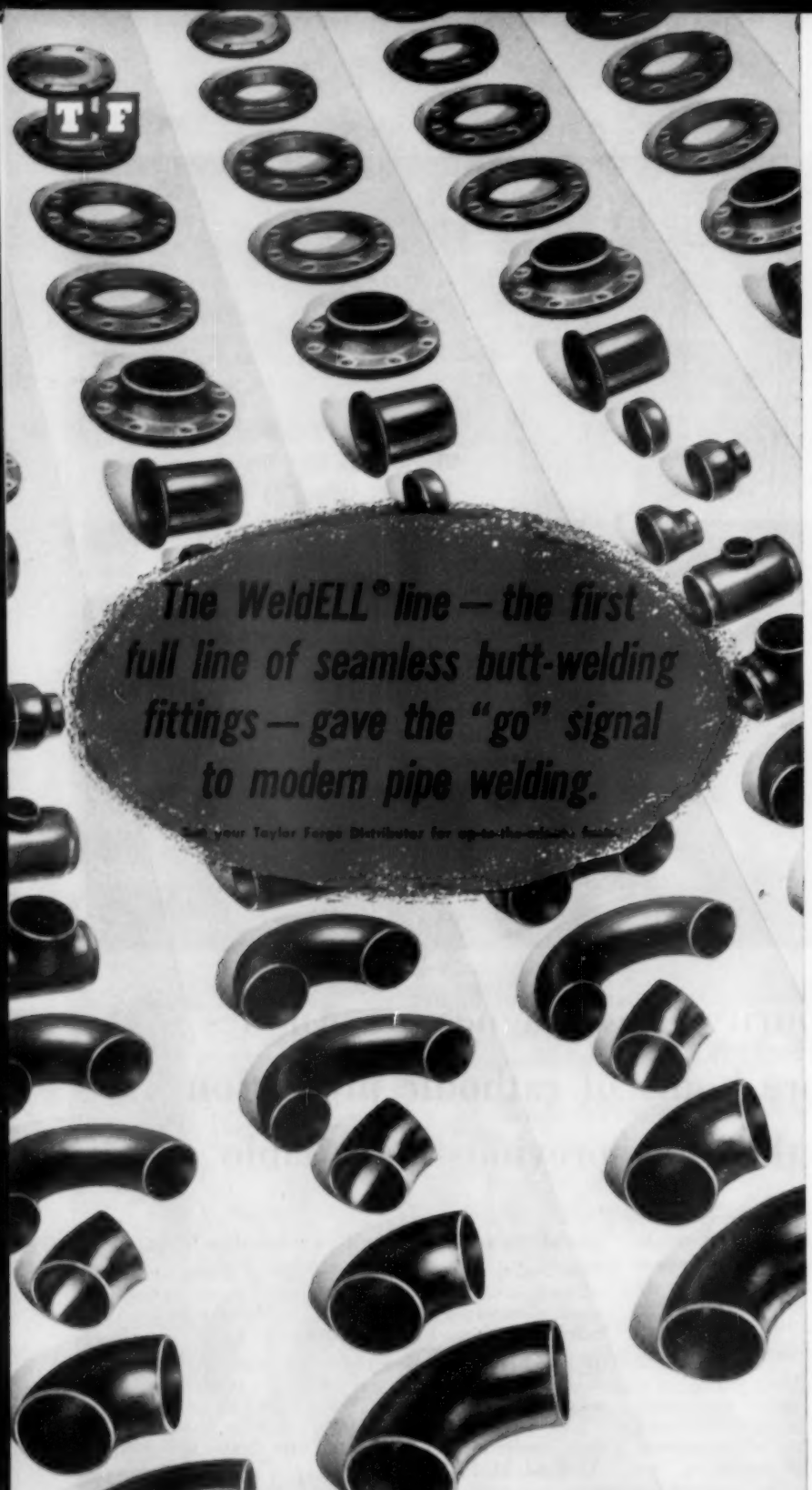

We had to quit guessing in the twenties

The founder of Taylor Forge used to say that "uniformity of strength should be the final goal of every engineer" . . . and no doubt this kind of thinking motivated the Taylor Forge organization to take so much initiative in the development of forged steel components for pressure piping.

The pattern was set in the twenties. Before 1920 little had been done in the way of pipe fitting and flange standardization. As early as 1905, however, Taylor Forge had produced forged steel flanges for Taylor pipe, and they had proved so superior to cast iron flanges that within a few years more flanges were being made for others than for our own use. But these forged flanges were bolted to the iron flanges of valves, pumps, and the like; so they simply followed cast iron standards.

In view of the obviously far greater strength of forged flanges, this was foolishly safe, and patently not at all in the "Uniformity of Strength" tradition. Moreover, in the twenties pressures were starting their upward climb. The 125 lb. and 150 lb. standard wouldn't do. Now it was 400; then 600; then 900 pounds. As the pioneer and leader in this field, Mr. Taylor saw the need for formulating standards and went to work on it.

Although one of the first studies conducted in this field, his work ranks to this day as one of the most thorough jobs ever done. In this work Mr. Taylor was in touch with Mr. Sabin Crocker, who is author of today's "Piping Handbook." He also collaborated with Professor E. O. Waters of Yale. Mr. Taylor ran exhaustive full scale tests on actual flanges to provide the test data which was then analyzed and formulated by Mr. Taylor and Professor Waters. The result was the Taylor-Waters Formula, presented before the ASME in 1927.

Still found in every engineering handbook, the Taylor-Waters formula was, and is, the basic means of determining flange stress under a given condition of loading. In the years since, Taylor Forge has also played a leading part in bringing standards into correlation with broadening needs . . . but this is *another* story.

An episode in the story of
Taylor Forge leadership in designed piping

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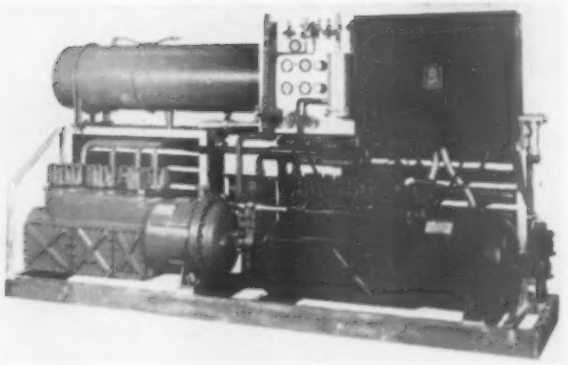
... What's New in Equipment?

Use the handy Time-Saver Cards ✔✔✔ to obtain additional information on these items

by Dan B. Miller



Chillers Reduce Temperature to—130°

A new group of liquid or gas chillers reduce temperatures to as low as —130° F. Portable models are suitable for either laboratory or production use and are available in a range of ½ to 7½ hp. A standard feature are flexible lines, integral with the unit, for the external testor process of the conditioned material.

Larger remote installations have capacities to 200,000 B.t.u. per hour and up to 100 hp. depending on temperatures needed.

The remote chillers are being used for condensing CO_2, recirculated processing of chemical or petroleum products, and also to provide temperature reduction in walk-in temperature-test chambers.

The patented Cascade system using safe Freon 13 and 22 is utilized in these chillers. *Conrad, Inc.*

Check No. 1 On The Time-Saver Card

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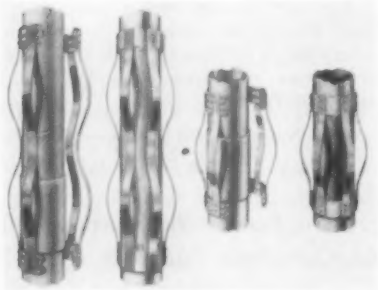

New Centralizers Designed For Maximum Efficiency

A newly designed centralizer takes 45 per cent less permanent set than the standard maximum allowance and provides 300 per cent more initial centering force than the standard minimum requirement. The new centralizers are offered in five ranges and four types; the long and short Lok-On and the long and short Slip-On.

Each of the five ranges is designed to give the operator the correct centering force with any length or size pipe. Since maximum efficiency in a casing centralizer requires a calculated relationship between the bowed height of the spring and the length of the spring, the over-all length of centralizers in the various ranges will vary with the size of the hole in which casing of a given size is run.

The long Lok-On centralizer exceeds every known requirement for centralizer performance. The short Lok-On centralizer is an economical means for centering shorter strings of casing in undeviated holes.

The long Slip-On centralizer is a counterpart of the Lok-On with the exception that it is always positioned between the casing couplings rather than around them. The short Slip-On is designed for between-the-couplings installation on shorter strings in undeviated holes. *Larkin Packer Co., Inc.*

Check No. 2 On The Time-Saver Card

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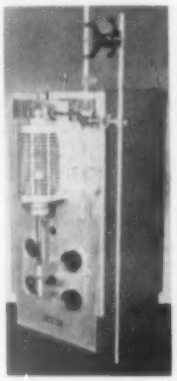
Combusion Unit Offers Rapid Sulfur Analysis



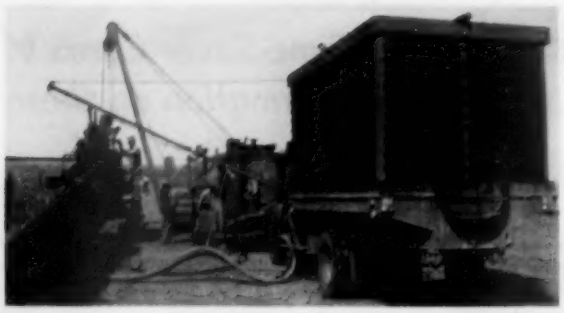
Fast combustion of heavy and light hydrocarbons is now possible with the Lindberg LI-500P H-F combustion unit. The induction furnace itself, prior to being modified for combustion of petroleum samples, was used extensively for sulfur and carbon determination.

The samples tested have shown good agreement with data accumulated by the bomb and lamp methods. Fifteen to twenty minutes are required for one complete analysis, from initial weighing to final computation. This will greatly increase the number of determinations per man per day, when related to methods currently in use.

Once the weighed sample is placed in the induction field, the operator devotes his entire attention to titrating. The titration assembly consists primarily of an absorption cell covered in A.S.T.M. specifications on the lamp sulfur method. In the titration itself, the combusted gases are passed through an acid solution of starch, potassium iodide, and several drops of potassium iodate. At the end of the burning period, the intensity of the blue color is adjusted to that at the start of the test. The amount of standard iodate solution added is a measure of the sulfur content of the sample. *Lindberg Engineering Co.*

Check No. 3 On The Time-Saver Card

What's New... Use the handy Time-Saver Cards



Dope Cooler Speeds Pipeline Laying

A pipeline dope cooler chills coated pipe so that it can be laid immediately. The truck-mounted cooling tower is towed behind the dope kettle, and the cooling jacket follows the coating and wrapping machine.

A 6-ft. cooling jacket with spray nozzles fits around the pipe. After the protective coating is applied to the pipe, the cooled water is sprayed onto the coating, then returned to the tower for recooling. Two pumps send the water to the cooling jacket and return it to the cooling tower.

The asphalt dope has a temperature of about 450° F. when it is applied to the pipe. Without the aid of the dope cooler, pipe must be left on the skids beside the ditch until it has cooled and hardened sufficiently to be lowered into the ditch.

The cooled water lowers the temperature of the freshly coated pipe approximately 300° F. at the rate of 60 ft. per minute, allowing it to be lowered immediately. Spray cooling has a number of other advantages. The uniform cooling action gives immediate bond and eliminates paint sagging. Instant lowering of the pipe permits immediate backfilling to speed up the entire pipe-laying operation and eliminates damage to the coating. There is no pipe movement in the ditch after backfilling. The water is circulated over the pipe at the rate of 300 g.p.m. The water capacity of the tower is 20 bbl. and the only water loss is through evaporation.

The pipeline dope-cooler jacket can work in any terrain. C-R-C coating and wrapping machines are designed to handle this new equipment. *Crutcher-Rolfs-Cummings, Inc.*

Check No. 4 On The Time-Saver Card

●

Tru-Torq Made for Heavy Construction, Machine Use

Tru-Torq, a new and lightweight Size 4, Type F torque wrench, has a capacity of 4,800 in.-lb., (Model 6 SD 4800), or from 100 to 500 ft.-lb., (Model 6 SD 500).

Its streamlined design and lighter weight (8½ lb.) make the Tru-Torq Size 4 wrench fast and easy to use on diesel-engine overhaul, construction, steel-tower erection, reinforced-steel construction, oil-field-equipment maintenance, and earth-moving-equipment maintenance.

The wrench will indicate accurate torque over-all adverse operating conditions. The operator can push, pull, twist from any position, while tightening a bolt without influencing the correct torque indication. The wrench is believed to be only about half as heavy as other similar-sized torquing wrenches. *Richmont, Inc.*

Check No. 5 On The Time-Saver Card

Drill-Collar Spear Tested For Difficult Fishing

Already field-proved with a 100 per cent record of success on difficult recovery jobs for major Mid-Continent and Gulf Coast operators, a new washover - drill - collar spear is designed to solve one of the most difficult fishing problems. The spear is installed inside the washover pipe at a desired point so that it may be screwed into the fish before the rotary shoe reaches the stuck point. After the joint is securely tightened the working string is turned about one-eighth turn to the left and lowered. This operation releases the tool from the control bushing, and washover operations may proceed with the assurance that when the fish is washed free it will be securely and safely caught.

There is 4 ft. of free travel in the tool to allow picking up the wash pipe for circulation and cleaning-up purposes. When it is necessary to pick up more than this, the slips may be released by first engaging them and then lowering the working string from 1 to 4 in. and turning one-quarter turn to the left. If a shoe has been dulled or the washover has been completed without freeing the fish, it is a simple operation to release the spear from the stuck pipe. It is equally simple to reconnect to the safety joint with the spear.

The tool is constructed with sufficient strength to allow the use of any rotary jar or pull any amount that may be applied to 4½-in. drill pipe. *Tri-State Oil Tool Co.*

Check No. 6 On The Time-Saver Card

●

Electric-Power Rig Made As Complete Package Unit

The diesel-electric plant of a new electric-power drilling rig is designed as an integral package furnishing all power requirements for offshore or land drilling.

The new standard-package power plant is priced to sell at about the cost of a conventional power rig. The Alco package plant consists of eight skid-mounted components with the power generated by two diesel-generator sets,

STRATAFRAC FRACTURES AND ACIDIZES IN ONE OPERATION

Fast combination treatment by DOWELL increased well potential and boosted allowable

The advantages of chemical acidizing and hydraulic fracturing are combined in a single operation with the exclusive Dowell fracturing service—Stratafrac*. This service is designed to increase oil or gas well production, and to hold rig time to a minimum. No gel-breaker solution is necessary.

Here's an example of the effectiveness of Stratafrac. One operator saw his well's production level off at 40 BOPD pumping, from an initial potential of 123 BOPD. After a Stratafrac treatment by Dowell, the well was repotentialed for 227 BOPD, flowing. Because of this increased potential, *the well's allowable was raised from 123 to 163* BOPD. The gel material used in Stratafrac not only carries the sand in suspension as do other fracturing treatments, but also contains chemical agents to dissolve the acid soluble constituents of the formation rock. Thus Stratafrac is successful in many formations not adaptable to conventional acidizing or fracturing.

There is a Dowell office near you ready *now* to treat your well. You have only to call them, or write DOWELL INCORPORATED, Tulsa 1, Okla., Dept. K-11.

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DOWELL SERVICE

fracturing services for the oil industry

DOWELL

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each consisting of a diesel engine, two main generators, and an auxiliary generator for extra power needs. Two motors, mounted on one skid, drive the draw works. Two pump motors circulate the drilling mud. A main control cabinet mounted in front of the two diesel-generator sets distributes the power as required. A driller's control cabinet and control stand complete the package.

The flexibility of the package permits the driller to run the draw works, pumps, rotary table, or other drilling apparatus singly or in combination. The standard package is designed so that a third diesel-generator set for extra power, or other modifications, can be made through simple additions to the control panel. No matter what modifications are made, the control system is so simple that a driller can operate the rig with push-button ease. *American Locomotive Co.*

Check No. 7 On The Time-Saver Card

●

New Rotary Uses Both Air and Water

A new self-contained, truck-mounted rotary drill employs both compressed air and high-pressure water. Known as Model M7-SA, it is especially efficient for water-well drilling and exploration work. It is available in capacities up to 2,500 ft. of 8-in. hole.

Suitable for mounting on any make of truck, the unit's air compressor and mud pump are both driven direct from the truck engine by a heavy-duty power takeoff. The compressor is a Davey 500-cu. ft. per minute unit. Pump is of heavy-duty duplex type.

The Model M7-SA mast is of tubular open-face box-type construction, 37 ft. high. It handles 20-ft. drill-pipe sections and is raised and lowered with hydraulic cylinders of 20,000-lb. rated capacity. Dual drum-hoisting assembly provides extra line and pull capacity.

A new feature is the location of all dials and controls on an instrument panel at the left rear of the truck. This gives the driller complete command of the machine at all times. Weight, complete with truck, is approximately 21,000 lb. *Davey Compressor Co.*

Check No. 8 On The Time-Saver Card

●

New Pump Automatically Adjusts to Fluid Level

A new oil-well plunger pump is controlled by measuring devices (oil-level meters), adapting the operation of the pump to the respective reservoir conditions. The higher the oil level in the hole, the higher the producing efficiency of the pump. The producing operations are equalized automatically, avoiding the necessity of periodically closing down the plunger pump. In contrast to intermittent operations, the continuous production guarantees a careful handling of wells, so that dangers of sand trouble or of the holes going to water are minimized. The continuous operation, which is adapted to the free flow of the oil into the hole, yields a higher output than could be normally achieved otherwise.

Particularly notable is the small weight and slender design of the pump, as well as its efficiency of about 80 per cent. It is easily installed in the hole. The whole group of an entirely enclosed system consisting of a pump and an engine, has a diameter of 135 mm. (or the equivalent of approximately 5.2 in.), weighing only about 200 lb.

These pumps have been installed for test purposes in several German oil

fields and have run smoothly without interruptions for a prolonged period. At a lifting height of about 1,600 ft., e.g., they produced from a well containing medium-heavy oil up to 2.2 g.p.m., depending upon the location of the oil level in the hole. *Pleuger Unterwasserpumpen Co.*

Check No. 9 On The Time-Saver Card

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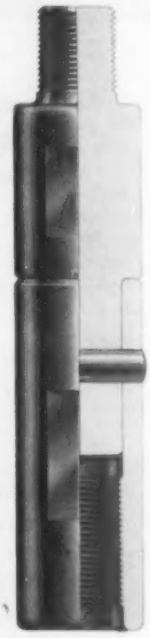
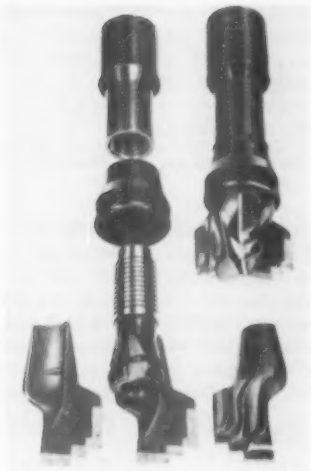
Safety Tool Eliminates Backoff Stripping Danger



A new-type safety tool, the rod safety joint, incorporates straight shear-pin design. Pounding down of the pump does not loosen or affect the joint in any way. However, should the pump become stuck, it is only necessary to shear the pin, free the rods, and come out of the hole. This rod safety joint eliminates danger to both men and equipment, caused by backing off and stripping; prevents possibility of stretching or twisting rods, hack sawing, kinking, or other damage which can necessitate junking prematurely. With this joint, there can be no danger of backing off tubing as can occur with right and left couplings. It is usually run three or four rods above the pump. Should the pump stick and become impossible to work loose, the operator pulls up the weight of the rods, plus rated shear strength, and the pin will snap. If the rods weigh 6,000 lb., the ⅝-in. joint will shear at 15,000 lb. *L. K. Pump Valve Co.*

Check No. 10 On The Time-Saver Card

What's New... Use the handy Time-Saver Cards



Insert Rock Bit Is Proved In Most Formations

A new insert rock bit designed to improve the efficiency of rotary drilling in seismic exploration, is known as the Hawthorne insert rock bit. The new bit has demonstrated a capacity to drill efficiently 95 per cent of all formations encountered in seismic-exploration drilling.

The insert rock bit is made of tough tool steel and utilizes a special quality of tungsten carbide inserts on the cutting surfaces of the bit. High toughness of these inserts minimizes breakage and a special welding process prevents loosening of the inserts while drilling. The dressing procedure on the blades produces a superior cutting edge. An improved water course in the bit for flushing out cuttings assures faster penetration and cleaner hole.

These bits are available in 4¼, 4½, and 4¾-in. type AC blade sizes, and 3½, 3⅞, 4, and 4½-in. type DB blade sizes, with the adapter sub into which the bit shank screws, available with box or pin connection to fit any available drill rod or drill collar. *Herb J. Hawthorne, Inc.*

Check No. 11 On The Time-Saver Card

●

Mud Stabilizer Recommended For Salt, Anhydride Zones

A new oil-well drilling-mud compound is said to cut drilling time by at least 10 days from the average time previously required for wells of similar depth and location. The new material, called Filcon SPF, stabilizes the viscosities and gel strengths of drilling muds. It also helps to reduce water loss in all types of mud. No unusual mixing techniques are required for its use.

An average drilling rate of 182.2 ft. a day was achieved in the five test wells of about 10,000 ft. in the Glendive, Mont., area. Filcon SPF and carboxymethyl cellulose were used to treat high-pH muds to drill through the red beds and salt stringers in the area. Mud costs per foot averaged $0.906. Filcon SPF is especially recommended in drilling salt or anhydride sections, since it is more tolerant of calcium sulfate and salt contaminants than unstabilized muds. A high-molecular - weight, sulfonated - phenol formaldehyde resin, Filcon SPF is available in 50-lb. moistureproof bags. *Monsanto Chemical Co.*

Check No. 12 On The Time-Saver Card

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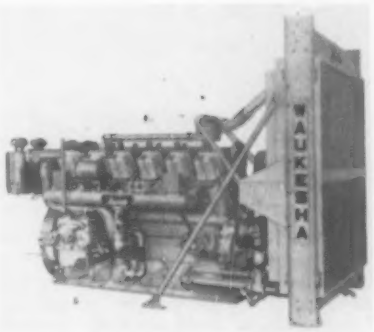


V-12 Power Unit Eliminates Compounding In Instances

The new Model VLR series 12-cylinder power unit is available for use with propane-butane or natural-gas fuel, and as a full diesel with normal aspiration or turbo-supercharged.

The unit is a high-compression, overhead-valve, 60° V-block, 4-cycle engine, with 8½-in. bore and stroke, and 5,788-cu.-in. displacement. Operating on butane-propane, it develops approximately 870 hp. with radiator, fan, and air cleaners. Unit ratings of the normal diesel and the turbocharged diesel are approximately 800 and 1,100 hp., respectively. Bare-engine ratings are higher. Maximum speed is 1,200 r.p.m.

In many instances this engine eliminates the need for engine compounding. Initial cost of the unit is less than the cost of two engines, each with half the horsepower, and the weight is less; transportation, moving, and installation are cheaper, easier, and faster. Maintenance time and cost are less, fuel consumption is lower, less operating attention is required, and actual output is greater.

Important applications of the new V-12 include all segments of the drilling industry, feeder pipelines, heavy-compressor operation, various offshore and work-boat operations; and wherever there is the need for continuous, heavy-duty operation requiring up to 1,000 hp. *Waukesha Motor Co.*

Check No. 13 On The Time-Saver Card

●

Fork Lift Tractor Made For Off-Pavement Use

A fork-lift attachment for tractors is designed for mechanized material handling on off-pavement surfaces.

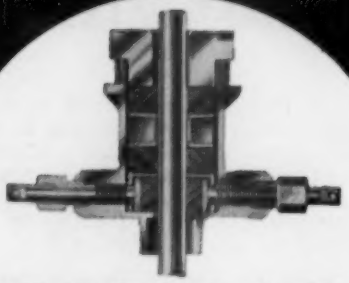
Known as the Sherman Fork-Lift, it is designed for use on Ford tractors. Its ability to operate on unpaved or rough terrain brings the advantages of mechanized material handling to industries which cannot utilize the standard industrial fork-lift truck because of its low clearance, narrow tire treads, and small wheels. The Sherman Fork-Lift can be used wherever a tractor will operate.

The attachment operates hydraulically. It will lift a load up to 4,000 lb. 10 ft. into the air. By means of reversed steering and driver's seat, the lift moves in exactly the opposite direction from a normal tractor, the

conventional rear wheels becoming the forward wheels. Power steering is provided as a standard feature.

In addition to 27, 33, and 48-in. lift forks, other attachments include a crane, angle dozer, scoop bucket, concrete bucket, and concrete-block forks. Most special-purpose fork-lift attachments are also adaptable to the unit, enabling it to lift and transport a wide variety of materials. Attachment changes can be made in 5 minutes or less. *Sherman Products, Inc.*

Check No. 14 On The Time-Saver Card



RATIGAN

No. 176 Self-Oiling

STUFFING BOX

Ratigan Stuffing Boxes receive lubrication direct from pumping well . . . an excellent feature which eliminates the human element, and assures thorough lubrication of polished rod. Ratigan Stuffing Boxes are made with or without shut-off from high grade electric steel and are tested to 3000 pounds.

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They're NEW

- Bulletins
- Catalogs
- Brochures

for your copy, check ✓ ✓ the Time-Saver Cards.

Self-Priming Centrifugal Pumps explains graphically the specifications, applications, and sizes of various types of centrifugal pumps. Bulletin W-395-B2 presents information on component parts, characteristics, ranges of application, and a comprehensive chart of the pump models listing their dimensions in inches. The pumps are frame-mounted with capacities to 550 g.p.m., heads to 140 ft., and sizes from 1½ to 4 in. *Worthington Corp.*

Check No. 15 On The Time-Saver Card

●

Instrof Tubing Trough, a 12-page bulletin, describes and illustrates a complete system for permanent and continuous support of instrument tubing. All items and fittings in the system are represented by photograph and dimensional drawings, and details of actual installations show some of the methods by which Instrof can be quickly and economically erected at the job site. *Instrof, Inc.*

Check No. 16 On The Time-Saver Card

●

Refractory Grain, Electrochemically Refined, is the title of a new 24-page informative booklet discussing the properties of Alundum fused alumina, Crystolon silicon carbide, Magnorite fused magnesia, fused zirconia, and Norbide boron carbide. Technical information about these products includes melting points, electrical properties, physical characteristics, typical analyses, grain sizes available, present and possible future applications, graphs, tables, and technical charts. *Norton Co.*

Check No. 17 On The Time-Saver Card

●

Data On Stainless-Steel Piping. Data of interest and value to engineers and designers associated with problems involving stainless piping are included in bulletin TB 356. This bulletin outlines methods of bending and joining stainless pipe and discusses the problem of light-wall versus heavy-wall pipe. Also included are a table of dimensions and weights of various stainless-pipe-size schedules and condensed technical data on mechanical and physical properties of the more popular stainless steels used for piping. *The Tubular Products Division of The Babcock & Wilcox Co.*

Check No. 18 On The Time-Saver Card

●

Flameproof Squirrel-Cage Motors. Type KFB, flameproof, squirrel-cage, induction motors designed to operate safely in flammable atmospheres are detailed in a series of perforated data sheets. The sheets include performance curves as well as typical installation illustrations. *The British Thomson-Houston Co., Ltd.*

Check No. 19 On The Time-Saver Card

●

Speaking of Engineering. Personnel and engineering facilities of this firm of design engineers are featured in the 16-page Form S-7. Processing and manufacturing plants designed by Vitro are illustrated. Services described include design, detailed engineering, construction management, and preliminary operation. *Vitro Engineering Division.*

Check No. 20 On The Time-Saver Card

●

Mudwonder - Operation and Maintenance Manual. Operators, tool pushers, and crew men on drilling rigs can obtain prolonged service from Mudwonder mud-line valves by following instructions described and illustrated in the new Bulletin 543. Besides procedures to be used in maintenance, the 16-page booklet shows a detailed description of each part and its function. Typical erosion patterns for parts used in field-destruction tests are also pictured to give the new purchaser an idea of what he can expect from these valves. *Edward Valves, Inc.*

Check No. 21 On The Time-Saver Card

●

Engineering-Manufacturing, a comprehensive bulletin, outlines the firm's broad services in [illegible] fields: design and construction of process plants and process units; design and/or fabrication of special processing equipment, including a variety of trays and boiling caps; corrugated type expansion joints, both directed flexing, self-equalizing, and nonequalizing; and vapor-compression stills for purifying water in production volumes. *Badger Manufacturing Co.*

Check No. 22 On The Time-Saver Card

●

Tertiary-Alkyl Primary Amines. Physical properties such as solubility and surface-active, bactericidal, and corrosion-

inhibiting properties; chemical properties; suggest applications; and chemical reactions of these two groups of amines are discussed in publication SP-33. *Rohm & Haas Co.*

Check No. 23 On The Time-Saver Card

●

Vertical Volume Heaters. Catalog 32-27 presents a unit extensively used in multitreating systems. It is especially suited for well streams containing considerable sand and sediment. Four models, the Bantam, the Intermediate, the Standard and the Heavy are illustrated. The catalog includes a section on how to size the particular heater, and works out a hypothetical problem. *Black, Sivalls & Bryson, Inc.*

Check No. 24 On The Time-Saver Card

●

Nordberg TS-29 Engines. A new 12-page bulletin describes Nordberg 29-in. bore stationary and marine diesel engines which range in size from 4,500 to 10,800 hp. Bulletin 235 shows these engines installed in power stations, industrial plants, tankers, and cargo vessels. The bulletin points up the savings that may accrue from the use of straight-run or cracked-residual fuels. The type TS-29 engine operating as a Duafuel unit permits even greater savings where gas is abundantly available and inexpensive. Photographs and cross-sectional drawings show the rugged construction of this series. *Nordberg Manufacturing Co.*

Check No. 25 On The Time-Saver Card

●

A to Z Glossary of Radio Communications Terms. The 39-page booklet utilizes sketches, diagrams, and charts, as well as text, to define esoteric terms which describe the theory, nature, and operation of radio-communications equipment. The glossary ranges from Absorption Coefficient to Zero-Bias, lists technical and nontechnical organizations of interest to communications engineers, and supplies abbreviations of most widely used technical terms. *Radio Corp. of America.*

Check No. 26 On The Time-Saver Card

●

Shell-and-Tube-Type Heat Exchangers. National heat exchangers of the shell-and-tube type for petroleum and chemical-processing industries, are pictured and described in a new eight-page bulletin. The bulletin, No. HT-40, indicates that the full-floating head type of heat exchanger is the most widely used of its many custom-built designs. The bulletin reviews the building of heat exchangers; indicates the responsibility of the company's chemical and physical laboratory in assuring high-quality materials, and pictures heat exchangers in various stages of fabrication. A feature of HT-40 is a two-page spread of engineering and drawings of many heat exchangers, and their basic component parts, to assist engineers in completing heat-exchanger specification sheets. *National Radiator Co.*

Check No. 27 On The Time-Saver Card

●

Convoluted Couplings. Industrial expansion joints and bellows are thoroughly described in Catalog No. 55. The booklet provides complete data on single units with axial movement only, single units with offset and combination movements, double units with axial and combination movements, in sizes ranging from ½ through 72 in. *Solaflex Bellows Division, Solar Aircraft Co.*

Check No. 28 On The Time-Saver Card

●

National Type E Tubing Heads in 6 and 8-in. sizes rated at 2,000 psi. are described in a new, illustrated, four-page bulletin, No. 424. *National Supply Co.*

Check No. 29 On The Time-Saver Card

Photograph by courtesy of
The Vacuum Oil Company, Coryton Refinery, England

WILLIAM KENYON & SONS, LTD., DUKINFIELD, CHESHIRE, ENGLAND KH 158C

EQUIPMENT MEN . . . in the News

The new office and warehouse for Otis Pressure Control in Corpus Christi. The company has maintained a branch in Corpus Christi since 1942 and has other offices in Falfurrias and Victoria. Home offices and manufacturing plant are in Dallas.

Otis Expands Facilities At Corpus Christi

Otis Pressure Control, Inc., late in October had opened a new, 4,000-sq. ft. warehouse and office building on Campbell Lane off Highway 9 in Corpus Christi, Tex. The new plant is part of the company's general expansion plans in South, East, and West Texas and at its home office and manufacturing plant in Dallas.

Otis manufactures and markets a line of subsurface controls for oil and gas wells and also operates a large fleet of wire-line-service units. The firm is in its twenty-sixth year and has branch offices in all major producing areas in the Mid-Continent and Gulf Coast regions.

W. K. Waters, division manager in charge of the Corpus Christi area, stated that the company is working 10 wire-line and service-truck units out of Corpus Christi, and in Falfurrias and Victoria, Tex., which are district offices under the Corpus Christi branch.

H. C. Otis, Jr., executive vice president, said that the company has experienced a 30 per cent increase in personnel and service units since the first of the year. The manufacturing facilities and offices in Dallas will be doubled by a building program now under way. Also the branches in Odessa and Longview, Tex., will be enlarged according to present plans.

Franks' Managers Discuss 1955 Plans

Managers of Franks Manufacturing Corp.'s sales and service organization held their annual meeting in Tulsa recently to discuss plans for 1955 and to inspect new and improved products soon to be announced for 1955. Personnel attending were, top row: Jeff Gray, Kilgore, Tex., East Texas district sales manager; Stuart Corry, Tulsa, general sales manager; Dick White, Compton, Calif., West Coast district sales manager; Hilmer Heinritz, Alice, Tex., Southwest Texas district sales manager; W. G. Pitezel, Tulsa, sales manager; A. J. Rogers, Casper, Wyo., Rocky Mountain sales manager; Paul Maertzweiler, export; Louis Sears, Odessa, Tex., West Texas service manager; and Arthur Fessler, Tulsa.

Middle row: Joe Rutledge, New York City, export sales manager; Johnny Leyh, Tulsa, used equipment sales manager; Doug Lawrence, Tulsa, general service manager; Merle Scott, Tulsa, field engineer; H. E. Stanfield, Tulsa, purchasing agent; C. C. Simmons, Tulsa, vice president and works manager; and Carl White, Jr., president.

Bottom row: Tommy Knoblick, Great Bend, Kans., Kansas service manager; Al Hastings, Seminole, Okla., Oklahoma service manager; K. M. Lamer, Odessa, West Texas sales manager; Tom Stringer, Odessa sales; Vern Alley, Houston, Gulf Coast district sales manager; and Roy Shaffer, Farmington, N. M., New Mexico service manager.

Oilwell's Midwest Area Announces Sales Changes

Appointment of Joseph R. Nye as field representative at Gainesville, Tex., and transfer of William Secoy Munson to Odessa, Tex., as assistant district engineer, both for U. S. Steel's Oil Well Supply Division, have been announced by William Miskimins, manager of Oilwell's Central Midwest area.

Nye joined Oilwell in 1948 at Wichita Falls, Tex. He transferred to Borger, Tex., in 1950 and in January 1954 was named field representative at that city, the position he held at the time of his newest assignment.

Munson returns to the city where he joined Oilwell in 1950 as field engineer. In 1953 he was promoted to assistant district engineer at Hobbs, N. M., the position he held until his transfer.

Pickering Joins Sales Department Of Brewster

B. PICKERING

Bill Pickering, formerly Shreveport, La., store manager for Bethlehem Supply Co., has joined the sales department of Brewster Co., manufacturers of a complete line of draw works, drilling rigs, swivels, blocks, and other allied equipment, according to P. J. Parker, sales manager.

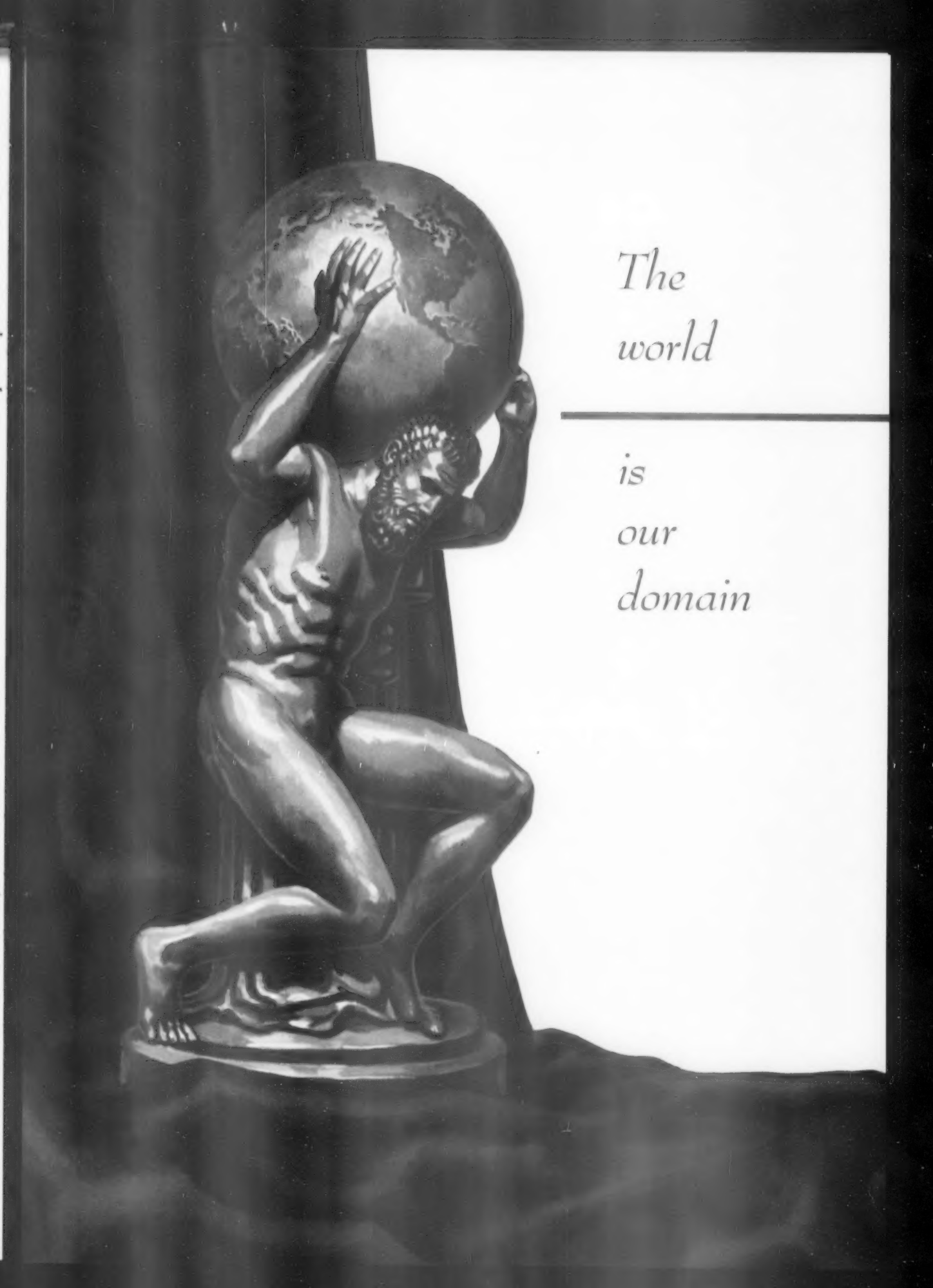
With more than 20 years in the oil industry, including both production and sales, Pickering will operate through southern Arkansas, Louisiana, and Mississippi from the Brewster main office in Shreveport.

Prior to his 10-year association with Bethlehem Supply, Pickering was in the production department of Placid Oil Co. and several other leading supply and production companies.

Hawthorne Names New Distributors

Herb J. Hawthorne, Inc., Houston, has announced the appointment of four new distribution outlets in the Rocky Mountain area as part of Hawthorne's planned distribution - expansion program.

Anderson Seismograph Bit Service, with stores in Wyoming, Colorado, and


The
world
is
our
domain

THE WORLD IS OUR DOMAIN—
a phrase truly reflecting the activity of
a company and a product that is
known and accepted in every oil producing
area throughout the free world.

FLUID PACKED PUMP COMPANY,
in its constant effort to provide the industry
with new and more efficient sub-surface
pumps and related equipment,
has recognized the requirements
of both the domestic and foreign markets and
has designed its product and built its
system of distribution accordingly.

FLUID PACKED PUMP COMPANY

Main Office and Plant, Los Nietos, Calif. • Distributed by the National Supply Co., Pittsburgh, Pennsylvania. Export: The National Supply Co., Inc., Export Division, 600 Fifth Avenue, New York • Co-Distributors: Berry Supply Store, Beacon Supply Co., Industrial Supply Co.

oilmaster
FOREMOST IN THE INDUSTRY

Montana has been selected as an authorized Hawthorne dealer. J. R. Anderson and Bill Cornish are in charge in Casper, Wyo., Jim Huskey is in charge at Grand Junction, Colo., and A. R. Anderson and John Kiplinger are in charge of the Sidney, Mont., store.

O'Tool Bit Co. will handle Hawthorne sales in Cortez, Colo., with J. Grey Wofford as the dealer.

Hawthorne products are now available at 25 authorized dealer stock points throughout the United States and Canada, with export facilities to serve international fields of operation.

Frost Is Distributor For Pipeline Coating Service

Pipeline Coating & Engineering Co. recently appointed Frost Engineering Service Co., Los Angeles, as its distributor for southern California, Arizona, New Mexico, and southern Nevada. E. Vernon Frost is now engaged in the engineering and sales of all Plico products which include pipeline insulating spacers and casing-end seals, polymastic cold-applied coating and Plico hot enamel, primer and tape, and cathodic-protection equipment.

Frost has formed Frost Engineering Service Co., which will engage in the engineering and sales of equipment for the pipeline, production, natural gasoline, and refinery departments of the oil industry and the natural-gas industry.

Schleeweis Is Made Sales Manager By Johnston Pump

SCHLEEWEIS

The appointment of Charles J. Schleeweis as sales manager, as well as general expansion of the facilities by Johnston Pump Co., have been announced recently by Hugh Glen, president. Schleeweis goes to his new post with long experience with Johnston Pump which he joined in 1946. For the past 6 years he has been manager of the firm's export sales and has traveled extensively throughout Latin America, India, the Middle East, and other parts of the world.

Schleeweis will have charge of the supervision of all domestic and foreign sales for the diversified line of Johnston vertical turbine pumps.

Republic Opens New Multipurpose Plant At Houston

A new Republic Supply Co. store and division headquarters is being opened in Houston to meet the increasing demand for oil-equipment supply and service in the Gulf Coast area. Cooper Kinney, vice president in charge of operations in the Gulf Coast area for Republic Supply, will center his operations from the new location. The 32,000 sq. ft. of floor space provided in the new building will contain facilities for the supply store, warehouse, and executive and sales offices inc'uding a sales lobby and a dormitory space for in-training personnel. The rapid increase of business from oil producers, refiners, pipelines, chemical plants, and other industries in the Houston area made this new store a necessary addition to the chain of 46 Republic Supply stores and 12 sales offices now serving a 9-state area. Republic Supply Co. was founded in Port Arthur, Tex., in 1910. It is owned by Robert S. Kerr, D. A. McGee, and associates of Oklahoma City.

Thornhill-Craver Names Head, Pipeline Sales

Thornhill-Craver Co., Houston, manufacturers of Unibolt products and jet-type pipeline strainers, has announced the promotion of Clint Horn to the position of sales manager of the company's pipeline products division.

For the past 4 years, Horn has served as the Unibolt district salesman in Oklahoma City. He has been with Thornhill-Craver for 6 years.

Youngstown Makes Tuthill General Manager Of Sales

John M. Tuthill, assistant general manager of sales of Youngstown Sheet & Tube Co. has recently been appointed general manager. Tuthill, who is now located in the company's Chicago office, will transfer to the main office in Youngstown, Ohio.

John P. DeHetre, who was appointed an assistant general manager of sales last June, with offices in Youngstown, was transferred to Chicago to succeed Tuthill. Appointments have been announced by Myron H. Watkins, who was recently elected vice president of Youngstown.

Tuthill joined Youngstown as assistant manager of flat-rolled sales in 1935, and was promoted to manager in 1950. He was appointed assistant general manager of sales in November 1952.

DeHetre joined the company in 1938 as an assistant field engineer in Los Angeles. He became a field engineer 6 years later and in 1947 was transferred to Youngstown as development engineer. He was promoted to manager of oil-country tubular sales in 1949. Before associating with Youngstown, he worked for Union Oil Co.

Industrial Crane Occupies New Chicago Facilities

Industrial Crane & Hoist Corp., manufacturers of overhead cranes, jib cranes, and monorail systems, recently occupied new, enlarged office and plant facilities at Chicago.

Paul W. Pearson, president, states that with 160,000 sq. ft. of space now available and with installation of considerable new machinery and equipment, the company has more than doubled manufacturing capacity for its expanded line of cranes.

Thorson Appointed To Newly Created Post By Ideco

W. K. THORSON

A new key engineering position has been established by Ideco, one of the Dresser Industries, with the appointment of W. K. (Buzz) Thorson as chief engineer, structural products. George W. Walton, Ideco vice president, announced that Thorson will coordinate an expanded drilling, workover, and production mast line which includes Full View, Kwik-Life, Full Lever Lift,

ANOTHER *Electric Power* CASE HISTORY

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CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS OR ADDRESS YOUR REQUEST TO P. O. BOX 2791, DALLAS, TEXAS

and Kwik Lever Lift masts with their related structural components.

Thorson was formerly assistant chief engineer of the Ideco plant at Torrance, Calif. For 2 years he was contract engineer in the aircraft and missile division of Consolidated Western Steel Division at Los Angeles.

Ideco structural-product-engineering offices are in Dallas.

Taft Named M-H Regulator Valve Division Manager

Marshall B. Taft has been named general manager of the valve division of Minneapolis-Honeywell Regulator Co. He succeeds Stephen A. Keller, who has been named general manager of the new Heiland division of the company in Denver.

Taft, formerly assistant to the president of the firm's Industrial Division in Philadelphia, will have responsibility for all phases of the division's activities.

Taft joined Honeywell in Chicago, after 5 years of private-law practice as legal counsel to the firm's aeronautical division. In 1945 he transferred to the Industrial Division in Philadelphia where, as assistant to the president, he has been responsible for staff operations.

Perforating Guns Atlas Opens Three Field Stations

Paul Charrin, president of Perforating Guns Atlas Corp., has announced the opening of three new field stations at Perry and Healdton, Okla., and Liberal, Kans., from which the company will provide simultaneous radiation logging, bullet, and jet perforating, and all types of wire-line services. Field crews and complete equipment are on duty at each station to render 24-hour service daily.

The new station at Perry is in charge of Henry L. Hill, recently transferred from P.G.A.C.'s Shreveport, La., station where he was logging engineer. He has been with the company for the past 7 years. Dick Swartwood, area salesman, serves this territory.

Custer C. Sokolosky, area salesman, represents the new Healdton station. Field operations of these two new stations are under the supervision of Jack Howse, Oklahoma district manager with headquarters at P.G.A.C.'s station at Pauls Valley, Okla.

Chas. B. Melvin, district salesman, represents the company's third new field station at Liberal, Kans., while service is under the supervision of Al Kangers, Kansas district manager in charge of P.G.A.C.'s Great Bend station.

Perforating Guns Atlas Corp. now provides oil-field services from 31 field stations and offices in this country, Canada, and Germany.

Continental Makes Osteen South Central Manager

J. R. OSTEEN

J. R. (Bob) Osteen has been appointed district manager of the South Central Texas district with headquarters in Houston, as announced by Continental Supply Co. Osteen, who has had extensive experience in oil-field-supply business, joined Continental in May 1953. He started as a warehouseman at Kilgore, Tex. After working in several stores in Texas, Louisiana, and Arkansas, he was transferred to Jena, La., as store manager. Other store managerships Osteen has held were at Brookhaven, Miss., and Shreveport, La. He was later pipeline and refinery salesman at Shreveport. Before assuming his new duties, he was field salesman in Houston.

Osteen's district is a part of the South Texas and South Louisiana division, which is headed by Raleigh Hortenstine, Jr., as division manager.

NEW-
AMERICAN IRON Hydraulic-Mechanical
PACKER HOLDDOWN, Type "HD"
Use this new, American Iron tool to hold packer in place in those applications where pressure under packer is considerably greater than pressure above.
Especially recommended for . . .
High Pressure Acidizing
Formation Fracturing
Water Flood Input Wells
Only packer holddown on the market that can be released without first equalizing pressures above and below packer.
AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF OIL FIELD EQUIPMENT
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MANUFACTURERS OF DRILLING EQUIPMENT
• PRODUCTION EQUIPMENT • FISHING TOOLS • PUMP SPECIALTIES

this simple idea cuts V-Belt costs

— as a V-Belt bends, feel its sides change shape!

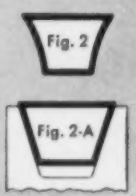
Pick up *any* V-Belt that has straight sides (Fig. 1) and bend it as if it were going around a pulley. At the same time, *grip its sides* with your fingers! You will feel the sides *bulge out* as in Fig. 1-A. Clearly, the bulging belt is forced to press *unevenly* against the V-pulley—and this concentrates wear at the points shown by arrows (Fig. 1-A).

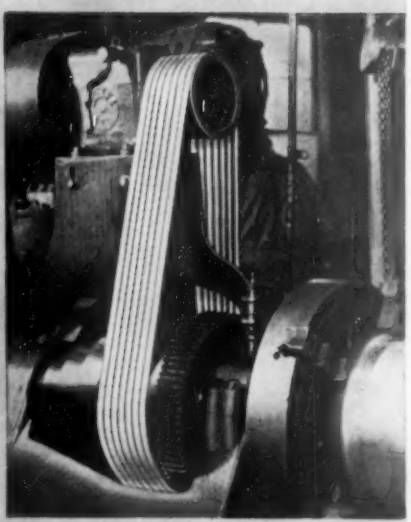
Now bend the belt with CONCAVE SIDES

(U.S. PAT. 1913699)

. . . the GATES VULCO ROPE (Fig. 2)

Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the full width of the Gates Vulco Rope—and this means longer belt life and *lower belt costs* for you!





Typical Gates Vulco Rope Drive—the Gates V-belts are built with Concave Sides to insure longer belt wear.

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EXPLORATION

A Candidate for Oil's "Oscar"

by Frank J. Gardner

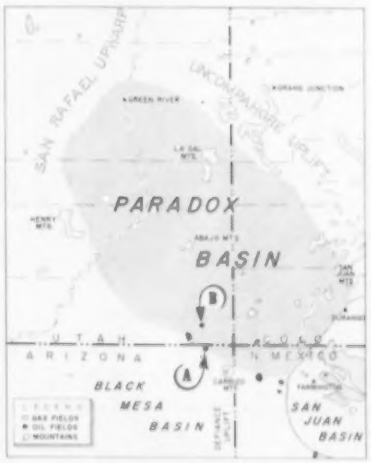
A HIGHLY important discovery well is in the process of completion. It's important for several reasons, not the least of which is the fourth finding feather it plants in the exploration cap of Shell Oil Co. First South Dakota, then Nevada, and, recently, Arizona have yielded to Shell's inquisitive drill since January of this year.

Now, another "first" has been recorded at Shell 2 Desert Creek, a lonesome wildcat in southeastern San Juan County, Utah (B on map). Here, a flow of 1,150 bbl. of oil per day through a 1 10/64-in. choke has established the first flush oil production from the Paradox member of the Pennsylvania-Hermosa formation in the virgin Paradox basin of southeastern Utah and southwestern Colorado. There has been some previous noncommercial oil and gas production within the basin limits, as shown on the map, but this is the first real oil field in the province. It opens up the entire southeastern quarter of Utah and much of southwestern Colorado to future deep exploration, and it marks another milestone in Rocky Mountain oil history.

The well . . . Shell 2 Desert Creek lies 8 miles northeast of Boundary Butte, a Permian field not currently producing; it is 13 miles northwest of Shell's recent Arizona opener, the 2 East Boundary Butte (A on map). Both of these older areas are considered to lie on the northern extremity of the Black Mesa basin of northeastern Arizona.

Production in the new discovery is coming from the Paradox sandy lime in the upper part of the Pennsylvanian-Hermosa formation. The test was drilled by Noland Drilling Co., of Tulsa, to a total depth of 7,230 ft. (in Devonian) and was plugged back to 5,338 ft. for completion. Casing perforations are at 5,244-72, 5,294-5,306, and 5,316-20 ft.

Three tests have been run during the early completion stages; the first of these recovered 1,160 bbl. of fluid, of which 1,128 bbl. was clean 40° oil. On the second, 2 hours in duration, the well flowed through a 74/64-in. choke at a rate of 1,150 bbl. of oil per day, with tubing pressure of 95 psi. The third test, lasting 3 hours and using a 14/64-in. choke, resulted in a flow of 214 bbl. of oil per day (tubing pressure 350 psi.). The most encouraging factor in all these tests was the absence of water; initial tests on previous wildcats in the area have all flowed considerable amounts of water from the Paradox.



Shell Oil Co. 2 Desert Creek has added a new oil-producing formation and a new oil-producing basin to the Rocky Mountain area as a climax to the Rockies' busiest year.

The formation . . . A word here concerning stratigraphic nomenclature might be in order; in recent years, the Paradox has been recognized as a member of the Pennsylvanian-Hermosa formation, the first relatively stable datum that can be picked in the Paleozoic section of this evaporite basin. It is overlain by the upper Hermosa member and underlain by the lower Hermosa member. The Paradox includes series of limestones, shales, dolomites, anhydrites, and salt, and wedges out to the south as the southern border of the basin is approached.

At Shell 2 Desert Creek, operators reported top of the Hermosa at 4,160 ft., top of the Paradox at 5,200 ft., and top of the Devonian-Ouray at 6,380 ft.

The basin . . . What about this new producing basin? Why is it important? It is an evaporite basin—a salt basin, not unlike the Permian basin of West Texas and New Mexico. It has been defined as "that area in which the Paradox member of the Hermosa formation is known to be present." It is also referred to in the literature as the "Colorado River Salt Basin." It is bounded on the northeast by the broad Uncompahgre uplift, on the northwest by the San Rafael upwarp, on the south by the Monument and Defiance uplifts, and is separated from the San Juan basin on the southeast by the slight "Four Corners Platform." Southwestern definition is not clear-cut, but a small upwarp known as the Circle Cliffs uplift separates it from the Kaiparowits basin.

Exploration efforts within the basin are plagued by rapid lithologic change, both in character and in thickness, in the Paleozoic section. Local structures are complex, and their oil-producing potentialities are believed to be considerable, but drilling them will involve time, patience, and money. It is to be expected that many of the surface anticlines in the deeper, northern part of the basin, most of them long, steeply folded, and pierced by salt along their crests, will eventually be oil producers.

The basin itself embraces some 19,000 sq. miles, and offers a sedimentary section Cambrian to Upper Cretaceous in age. Little is known of the probable sedimentary thickness which waits to be explored, but minima of 7,000 ft. to more than 10,000 ft. are likely. It is replete with strong oil and gas showings, subsurface unconformities, and outcrop seepages, but its development has been retarded chiefly because of inaccessibility, lack of detailed knowledge of its geology,

What Shell has found here on the southern basin border is not yet fully known, but here is likely territory for strat-trap hunting, and it is probable that many new wedge reservoirs remain to be discovered between the Four Corners area and the San Rafael upwarp.

All are new . . . A new well, a new formation, and a new basin in the oil column; these are exploratory achievements typical of a highly significant exploratory year. If there were such a thing as an oil "Oscar," then surely it should go to Shell in 1954.

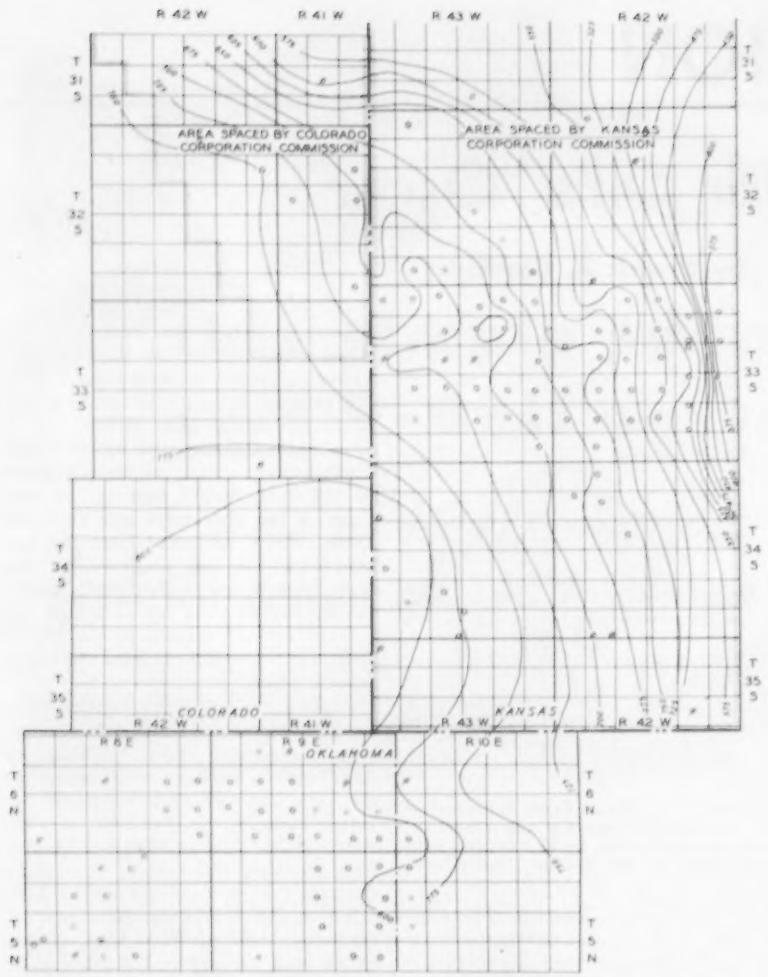


Fig. 1—Contour map of Greenwood field, Baca County, Colorado, and Morton County, Kansas.

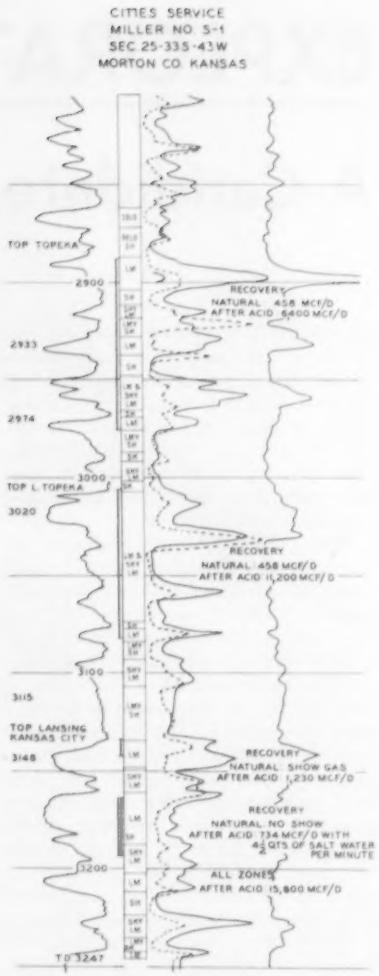


Fig. 2—Electric log . . . Miller "S" 1, Section 25-33s-43w, Greenwood field, Morton County.

Water Headaches Plague Greenwood Drilling

Water tables in this field do not follow mapped structure contours

by R. T. Widney

IN the past 2 to 3 years, with the limits of the vast Hugoton field being established, and with the increasing demand for gas, the oil industry has started probing the deeper rocks of the high plains area of western Kansas, eastern Colorado, and the Panhandle areas of Oklahoma and Texas, in search of new reserves.

Several new oil and gas discoveries have been made. One of the more important and largest is Greenwood field, a Cities Service Oil Co. discovery, in Morton County, Kansas, and extended by Amerada Petroleum Corp. et al. into Baca County, Colorado. The field is located just north of the junction of the Colorado-Kansas-Oklahoma state lines (Fig. 1).

Author is geologist for Cities Service Oil Co., Bartlesville, Okla. Paper presented before Rocky Mountain Association of Geologists, October 14, at Canon City, Colo.

The water tables or levels in this field give the geologist and engineer more headaches than in most fields. These water tables do not follow structure contour lines that have been mapped. They cross these contour lines at random.

Field limits . . . The drilling unit for the field is one well to 640 acres. The present spaced limits of the field cover approximately 300 sq. miles. To date there have been approximately 70 wells drilled in the field. They have an average open flow of 15,000-20,000 M.c.f. of gas per day. The dry-hole experience for the field has been low.

Markets . . . Colorado Interstate Gas Co. is presently the only market outlet for the gas. The field is currently producing 60,000 to 70,000 M.c.f. of gas per day, of which about 40,000 M.c.f. of gas per day is going to Interstate's Colorado markets and the remainder is

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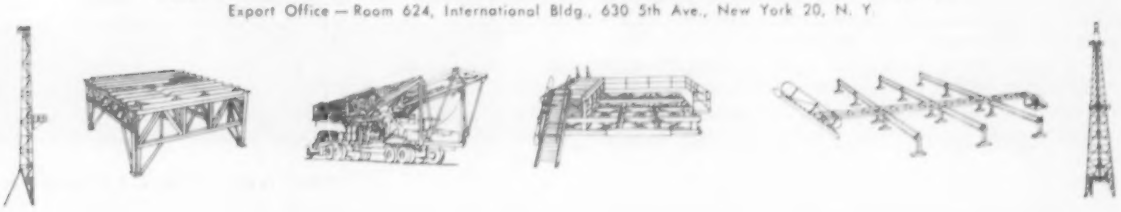

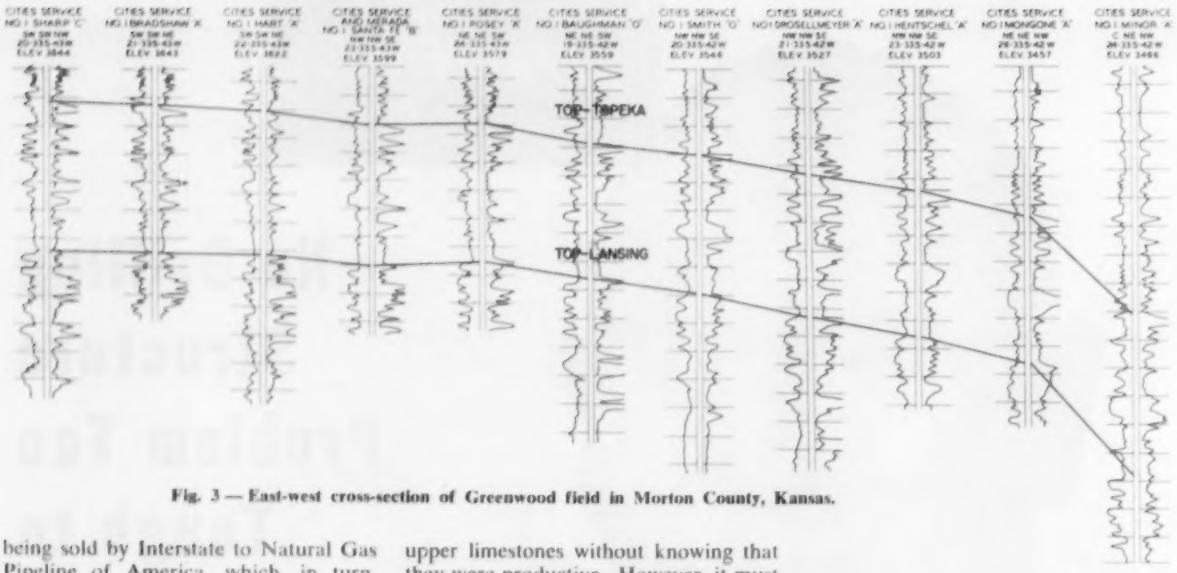

Fig. 3 — East-west cross-section of Greenwood field in Morton County, Kansas.

being sold by Interstate to Natural Gas Pipeline of America, which, in turn, resells it to its Michigan markets.

Reserves . . . Present estimates give the field an ultimate recoverable reserve of 1½ to 2 trillion cubic feet of gas.

Discovery History

Discovery of the field was made in the early part of 1951 in the Cities Service 1 Greenwood "B", located in NE NW 14-33s-42w, Morton County, Kansas. This well was located on a seismograph high and drilled to the Arbuckle limestone. Shows were encountered and gas recovered in a drill-stem test of the lower Morrow (Keyes) Pennsylvanian sandstone. The well was completed in this zone for an open flow of 7,800 M.c.f. of gas per day. The next year, the west offset was drilled and completed as a small producer from the same horizon.

Examination of these electric logs by Cities Service's geologists led them to believe there were possible gas pays in some of the upper limestones notwithstanding the fact that staining was not found in the well cuttings from these zones. On the next well, the north offset to the discovery well, a mud-logging truck was used. First gas shows were recorded in the limestones just above the Topeka. A drill-stem test of these recovered only 30 ft. of drilling mud. The next shows recorded were in the upper Topeka limestone. A drill-stem test of this zone gaged 214 M.c.f. of gas per day and recovered 60 ft. of drilling mud. Salt water was recovered in a drill-stem test of the Morrow sand. Casing was cemented and the Topeka-Lansing-Kansas City limestones were tested. The well was completed in the Topeka for a 20-minute open flow of 15,800 M.c.f. of gas per day with a shut-in pressure of 426.5 psi.

Two wells were drilled through these upper limestones without knowing that they were productive. However, it must be remembered that at that time, these horizons had not produced in this province and also that dry gas is seldom detected in rotary drilling in this area. This experience has led to the use of the gas-detecting trucks more and more on wildcat wells in this area, as another aid to the geologist and engineer in their task of finding possible gas pays.

Drilling to the east of this shallow lime discovery resulted in a structurally low dry hole and a small gas producer. After a great deal of studying, the next shallow test was staked 2 miles west of the discovery well. It was completed for 31,500 M.c.f. of gas per day. Faced with early lease expirations, rapid development was forced. Three successive 2-mile stepouts were drilled and each was completed for a good gas well. Subsequent development was scheduled to validate the short-term leases.

Greenwood's Geology

(Contributed by W. F. Absher)

Greenwood field is located on the southwest flank of the Hugoton embayment of the Anadarko basin and northeast of the Sierra Grande-Amarillo buried mountains.

Widespread control on the Mississippian limestone suggests that the field lies on a northeast-plunging nose off the Keyes dome of northeast Cimarron County, Oklahoma. But control on the lower Permian and upper Pennsylvanian strata shows only regional east dip with some variation from the average rate of about 30 ft. per mile.

Lower Pennsylvanian . . . Gas production has been established from two lower Pennsylvanian (Morrowan) sands (locally the upper is called "Purdy" and the lower "Keyes"), and from a series of limestones tentatively correlated as lower Virgilian (Topeka and Toronto) and upper Missourian (Lansing).

Morrow sands . . . The Morrowan sands are erratically distributed and irregular in thickness where they occur. There has not been enough development to determine whether or not structure has been the controlling factor in the accumulation of hydrocarbons in these sands.

Upper Pennsylvanian . . . The controlling factor for the accumulation of the gas in upper Pennsylvanian limestones seems to have been pinchout or decrease updip of porosity. Production has been established through a range of over 400 ft. from the low east side to the high west side.

Water has been encountered in the upper Pennsylvanian pay zones on both the high and the low sides of the Greenwood upper Pennsylvanian gas accumulation. A similar water condition exists on the high and low sides of the Hugoton gas accumulation in rocks of Permian age.

The original rock pressures encountered in both the lower Pennsylvanian sands and the upper Pennsylvanian limestones are subnormal for their depths. This condition was also found in the Hugoton, Keyes, and the Texas Panhandle gas accumulations. The writer suggests that these anomalous conditions, high trapped water and subnormal pressure, may be the results of regional tilting great enough to reverse the original dip existing at the time of the gas accumulations.

The upper Pennsylvanian limestones hold all but a small portion of the proved gas reserves of Greenwood field. The gas from the limestone pay is dry.

sweet, and tests from 950 to 990 B.t.u. per cu. ft. The Morrowan sands produce, with the gas, a lean distillate, averaging about 4 bbl. of 65° to 75° gravity per 1,000 M.c.f. of gas. The gas is sweet and tests 1,025 B.t.u. per cu. ft.

Topeka-Lansing-Kansas City Gas Reservoir

Fig. 3 is an east-west cross-section of the Kansas portion of the field, starting on the east with the 1 Tolbert, 24-33s-42w, and ending on the west with the 1 Sharp "C," 20-33s-43w.

The interval from the top of the Topeka to the top of the Lansing-Kansas City is constant to the western edge of the field in Baca County. On the east, the lime sections are thick and well developed. To the west, these limes begin to break up and shale out.

Rock pressure . . . The virgin rock pressure of the Topeka-Lansing reservoir is 435 psi. The average porosity is approximately 15 per cent and the connate-water content of the reservoir ranges from 20 to 35 per cent.

To date, there are insufficient production data to determine the exact nature of the reservoir energy; however, in all probability it is a gas-expansion-type reservoir.

Drilling Procedures

The casing program used in developing the shallow limestone pays is to set 8⅝-in. casing at about 600 ft. and 5½-in. casing at 3,200 to 3,300 ft. through the anticipated productive section of the Lansing-Kansas City limestone.

Artesian flow . . . There is a strong artesian flow of highly alkaline water at a depth of 500 to 540 ft. over a large portion of the area. Surface casing is set through this water zone. This operation can be very hazardous. For example, in one of the wells drilled, total depth of the surface hole had just been reached and preparations were being made to run pipe when a solid 12-in. stream of water started flowing 2 ft. above the ground. After trenching the water away from the mud pits and mixing a very heavily weighted mud, the surface pipe was run and cemented on the third attempt. Then while waiting for this cement to set, water broke through outside of the surface pipe. (Evidently, the water had washed and carried most of the cement away from the pipe.) Three cementing jobs and 5 days later, the artesian water flow was overcome.

Lost circulation . . . Another drilling hazard here is lost circulation. There are long intervals of sloughing shales and sandstones above the first limestones found at 2,000 to 2,500 ft. The worst of these are above the Cimarron anhydrite usually found at a depth of 1,400 to 1,500 ft. These two conditions working hand in hand have made this area very treacherous to the unwary driller in that with loss of circulation, these formations are very apt to cave into the hole around the drill pipe resulting in a fishing job.

The first thief zone is usually encountered at 1,200 to 1,300 ft. and the second is in the producing horizon. To prevent loss of circulation, a good mud is carried from surface to total depth. The mud bill for this depth well averages $2,500 to $3,000.

The hazards for drilling deeper wells are the same as those for the shallow, with increased chances of lost circulation in the additional sections of porous limestones. Crooked-hole trouble for the deeper wells in this area is not as great as that experienced farther east.

Long combination surface-intermediate casing . . . For deeper wells this casing program is becoming popular. That is, surface casing is set in the Cimarron anhydrite at about 1,400 ft. and the

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well drilled to total depth without an additional protective string. This program is generally followed in areas where the anhydrite is not over 1,500 ft. in depth.

At wildcats . . . When this program is to be used at a wildcat location, it is customary to rathole ahead to check for artesian water or shallow lost circulation. If either is encountered, the surface casing is cemented at a shallow depth and then the intermediate casing is cemented in or below the Cimarron anhydrite. Where the anhydrite is deeper, the regular surface-intermediate casing program is used with the intermediate string being set in the anhydrite or in the lime section at 2,500 to 3,000 ft. Mud bills for some of the 6,000-ft. Morrow sand wells have run as high as $20,000 where bad lost circulation developed.

Completion Practices

The first step in completing a well is to evaluate the electric log and try to determine the water-free pay zones to be tested. This is not always easy. In the 1 Miller "C," the bottom of the Lansing proved to be water bearing. Final completion of this well was in the upper and lower Topeka for an open flow of 22,500 M.c.f. of gas per day.

The usual completion practice is to divide the prospective pay zones into three groups: upper Topeka, lower Topeka, and Lansing, and test each group as a unit, using 4,000 to 5,000 gal. of acid for each unit. Shut-in pressures and gas samples were taken of each limestone group as tested in the first three wells completed in the field. The pressures and the gas of all the groups were comparable; therefore, it was considered practical to produce all groups together. The lower group is tested first. If there is a question as to whether part of the group is water-bearing, that part is perforated and acidized first.

If the well remains dry after being vented to the atmosphere for 10 to 15 minutes, it is considered to be a good completion and a 20-minute open-flow test is taken.

Water

The 1 Mongone "B," 26-33s-42w, and the 1 Frazier "A," 3-33s-42w, are in about the same structural position. The Mongone "B" produces gas from the Lansing, while the Frazier well made water from this zone. Other examples of these irregular water levels are the three dry holes in the center of production in Sections 15, 16, and 18-33s-43w. Some of the producing wells to the north and south are slightly higher and some are slightly lower than these dry holes.

Most of the southwest part of the Kansas portion of Greenwood field does not produce from the Lansing. The area in Baca County, Colorado, is productive only in the lower Topeka. The east-central portion of the field produces from all three horizons.

Operations

In drilling these shallow low-pressure gas wells, a blowout preventer is not used; the rig is set on timbers for a foundation. It takes about 10 days to drill a shallow gas well and 1 week to 10 days to perforate, acidize, and test one.

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TEXAS

WEST TEXAS

SE Reagan County Has Big Fusselman Strike

The Texas Co. 1 Young, discovery 4 miles southeast of the town of Big Lake, has been completed for a calculated 1,669 bbl. of oil a day. Potential was based on a 5-hour test through 28/64-in. choke with produced 347.7 bbl. Prior to completion, the well flowed a total of 371 bbl. of oil through various size chokes in 10 hours.

Tentative top on the Fusselman was 9,284 ft., or minus 6,607 ft., based on estimated elevation of 2,677 ft. Operators reported

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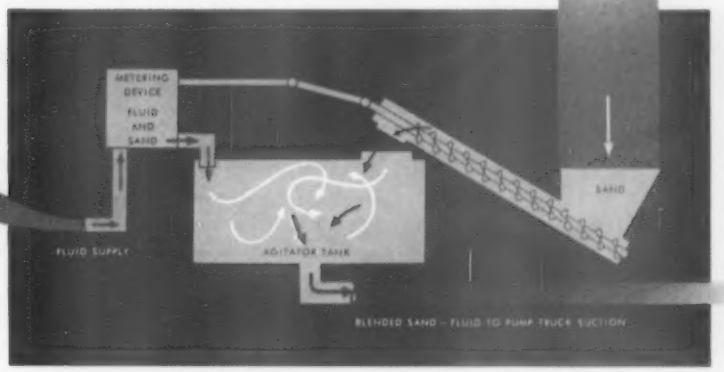

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Several successful techniques that combat initial plugging have been developed to permit individualized treatment for each well. One new method starts the treatment with relatively fine sand to create the initial wedge and follows with regular sand to extend the fracture. Another method gradually builds up sand concentrations as the formation permits. A third system starts the fracture with no sand in the fluid, but adds sand to the carrying medium in gradually increasing amounts.

All of these methods are now possible with the proportioners that can change sand concentration over wide ranges during the treatment, control and measure the sand concentration going into the well, mix large volumes and operate at high rates of injection. Several models of the new proportioners, including big frac units that can handle 6300 pounds of sand and 70 barrels of fluid every minute, are now successfully fracturing wells that will not respond to conventional treatments. For your fracturing job, call for the specialized equipment and 40,000 job experience that only Halliburton can offer. Phone your local or district office of the Halliburton Oil Well Cementing Company.

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strong gas kicks in drilling to 9,346 ft. The 10-hour gage was made from open hole after drilling cement on casing set at 9,239 ft., during which the tool plugged intermittently.

Following that test, operators opened the well on 30/64-in. choke and flowed 114 bbl. of oil in 1 hour. Tubing pressure was around 500 psi. and gas-oil ratio 180:1.

Location of the well is in Section 1, GC&SF Survey, A-170. The Texas Co. holds surrounding acreage, except a northeast offset section.

The Texas Co. has elected to run casing and complete to total depth of 13,625 ft. at 1 Magnolia-Ratliff, Ector County Ellenburger discovery north of Odessa. The discovery made a heavy flow of oil from 13,585-13,605 ft. and recovered over 11,000 ft. of oil in drill pipe in testing at 13,605-25 ft.

Terry County . . . Joseph I. O'Neill, Jr. and Sharples Oil Corp. 1 Day has been plugged back to complete as a 221-bbl. pumper from Glorieta pay from perforations between 5,998-6,026 ft. Total depth at 7,015 ft. tested the Clear Fork.

Location in 23-D11-C&M Survey is approximately 3 miles northeast, and on the apparent trend set this year by heavy drilling for Clear Fork oil in Prentice 6,700 ft. and other fields in that area. Several areas in the trend also produce from the Glorieta.

Ward County . . . British-American Oil Producing Co. 1 J. B. Tubb, Ellenburger discovery 14 miles southeast of Monahans, in the extreme eastern section of the county, has been completed for a daily flowing potential of 312.85 bbl. Gravity was 48.5° and gas-oil ratio was 1,610:1. Production was through 16/64-in. choke, from perforations at 8,236-60 ft. Flowing tubing pressure was 140 psi.

This well also indicated production in the San Andres, Glorieta, Fusselman and the Waddell sand. British-American's 3-G Tubb, a close-in northeast offset, will be drilled as a Glorieta test. The firm's 2 Tubb, one location east, will drill to the Ellenburger.

Upton County . . . Flush Ellenburger production has been extended ½ mile north and slightly west of Amacker-Tippett field at Hunt Oil Co. 4-106 Velma Tippett Amacker. Calculated potential was 2,952 bbl. of 52.7°-oil, based on a 6-hour flow of 123 bbl. of oil through ½-in. choke. Perforations were at 12,092-12,160 ft. Tubing pressure was 625 psi. and gas-oil ratio was 610:1.

EAST TEXAS

Henderson County Field Is Current Hot Spot

South Malakoff field, a 1953 discovery and currently one of the hot spots in East Texas operations with 7 rigs running, had two completions during the week.

Delta Drilling Co. 1 Malcolm, John Ward Survey, A-790, flowed 368 bbl. of 46° oil a day on final test, from perforations in the Bacon limestone at 7,570-80 ft. The test was made on ¼-in. choke, with gas-oil ratio of 870:1.

The same operators' 2 Pearl Gentry, Jose S. Cordova Survey, A-131, was completed for 357 bbl. of oil a day from perforations at 7,450-60 ft.

Rank wildcats scheduled . . . Slick Oil Co. was reported planning an early venture for Robertson County that would penetrate the Pettit and Travis Peak. The project is to be 1 Jay L. Jett, 6 miles north of New Baden townsite, in the R. K. Goodloe Survey. Proposed depth is 8,600 ft.

Ellenburger production will be sought at J. E. McKinzie 1 McKenzie fee, 6,500-ft. test in northwestern Bosque County, 5 miles southeast of Iredell. Location is in the James Hollingsworth Survey.

TEXAS GULF COAST

Galveston Bay Wildcat Recovers Oil on Tests

Tide Water Associated Oil Co. has an indicated oil-discovery 1½ miles north of Smith Point field, in Galveston Bay, where its 1 State Tract 102 wildcat filled 1,710 ft. of gas-cut mud and 450 ft. of oil in a 17½-hour drill-stem test of sand at 10,782-92 ft. Bottomhole flowing pressures ranged from 1,325 to 2,350 psi. Shut-in pressure gaged 5,445 ft. Location is on the Chambers County side of

(Continued on page 189)

CANADA

Western Canada Discovery Rate Shows Slight Decline

The discovery rate in western Canada slowed down considerably last week, with the announcement of only two gas discoveries.

One of these was recorded in British Columbia, while the other was in Saskatchewan. In addition to those two wells, Alberta's Bentley area tests continued to open up more gas-bearing zone, and Saskatchewan's Alida area oil discovery has established a very encouraging initial potential.

British Columbia . . . Pacific-Sunray 2 Montney, LSD 14, 36-86-19w6, is about 18 miles north of Fort Saint John town and 16 miles north of Fort St. John district gas wells. It is being drilled by Sunray Oil Corp.

Sizable gas flows were obtained in a stray sand in the Triassic, while small gas blows came during drill-stem tests in the Triassic "A" and "B" sands, in the Cadomin, and Gething.

Saskatchewan . . . This province's gas strike, in the Totnes area, being drilled by Socony-Vacuum Oil Co. of Canada, is on LSD 5, 21-28-18w3, 3½ miles east-southeast of Viking gas production. The well has been capped as a potential Viking gas well.

Bentley area . . . Alberta's two wells, both being drilled by The California Standard Co., continued to produce gas from the Mississippian lime on drill-stem tests.

The 10-7 South Gilbey has opened up 69 ft. of this lime. It is in LSD 10, 7-40-2w5. The other well, 4-5 East Gilbey, LSD 4, 5-41-2w5, reported latest drill-stem test 77 ft. below the formation contact.

Alida area . . . The other Saskatchewan wildcat in the Alida area which had previously been reported as an oil discovery has flowed oil from the Mission Canyon at the rate of 151 bbl. per day. This well, Imperial 4-35 Alida, LSD 4, 35-5-33w1, lies 6½ miles southwest of a wildcat that previously had found some Mission Canyon oil before being abandoned.

Big South Sturgeon Lake Oil Well Reports Completion

Union Oil Co. and Hudson's Bay Oil & Gas Co. announced that they have completed another high-volume oil producer in the South Sturgeon Lake area in northwestern Alberta, Canada.

The new well 5-33 Liberal, located 4½ miles west of 15-31 Liberal, which came in

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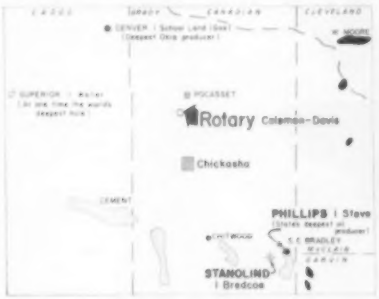
recently flowing at a rate of 4,500 bbl. per day, was placed on production, and on a 6-hour test flowed at a rate of 1,200 bbl. of clean oil per day. Production is from the Devonian reef, from a perforated interval 8,604-18 ft. Both wells are on the jointly-held 99,840-acre Liberal Reservation, and the operators are preparing to start two additional wells in the same block.

OKLAHOMA

Deep Grady County Wildcat Announced

A deep 13,500-ft. wildcat has been announced for the rank wildcat area 9 miles north of Chickasha in Grady County, southwestern Oklahoma. It is Rotary Development Corp. and Humphrey Oil Corp. 1 Coleman-Davis, SW¼ NW¼ 20-8n-7w.



The wildcat is located in the Anadarko basin. The oldest Pennsylvanian formations under the wildcat area are in the Springer series. From a thickness of about 2,600 ft. in the bottom of the basin the beds thin and pinchout updip north and west at considerable depth. The sandstone zones in the Springer shale section in this area hold possibilities of stratigraphic traps if the proper structure and depositional conditions are present.

The wildcat might indicate a trend that would reach northwest into Caddo and Custer counties, provided it is successful . . . linking it with the prolific Bradley field to the southeast. Hope for a tie-in with Bradley and the Golden Trend is held for completion of this wildcat. Notice on the map that the well is located directly east of the Superior 1 Weller, one-time holder of the world's deepest hole record; it is southeast of Denver 1 School Land—the deepest production in Oklahoma (gas); northwest of the Bradley areas and northeast of Cement. The outcome of the well will be watched with great interest by area operators.

Nearest Springer production is in Southeast Bradley field, 20 miles southeast. This field has wells having as many as six pay zones with potential production of as high as 1,000 bbl. per day per zone. There are 20 locations staked in the field. Chitwood field, 18 miles southeast of Pocasset, produces from Springeran sands.

Oklahoma Activity Remains At Strong Levels In All Areas

The year 1954 is going to be a significant one for exploration. Southern and southwestern areas report the most outstanding developments of late.

It appears that the Marshall County wildcat being drilled by Sinclair Oil & Gas Co. et al will be the year's biggest hit. The operators have gone below 6,680 ft. in the

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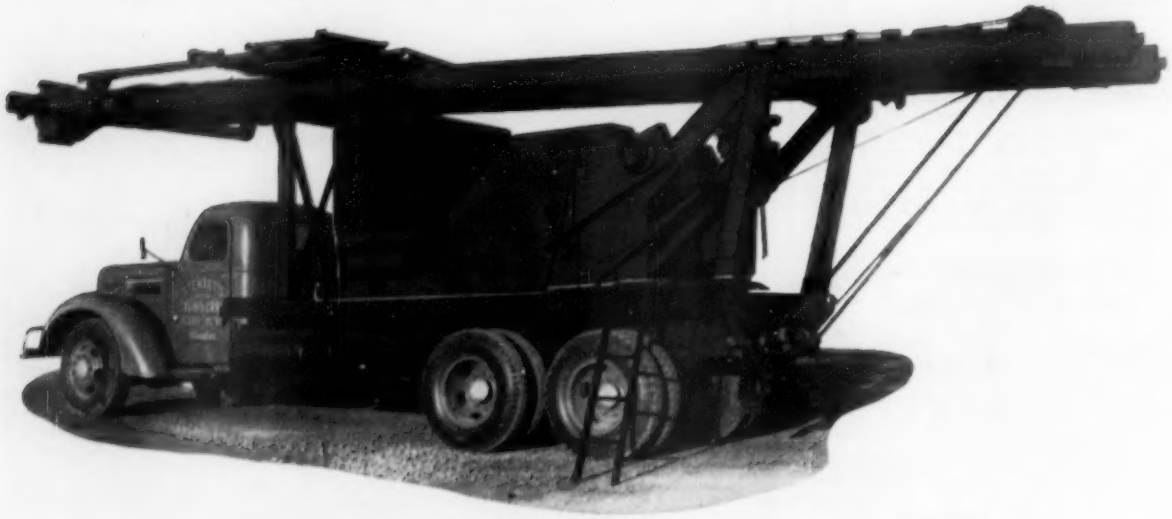

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Oil Creek shale after finding oil and gas on drill-stem test of the wildcat's eighth indicated commercial pay zone. The 1 Griffin, SE NE NE 16-5s-5e, showed gas in 4 minutes on drill-stem test in the basal McLish sand at 6,578-6,603 ft. Flow reached 80 bbl. per hour.

The first showing at the wildcat was found on test of the Lake Ardmore sand phase of the Springer (Pennsylvanian) at 1,254-72 ft. Recovery was 165 ft. of free oil. A drill-stem test in the Sycamore at 4,067-4,120 ft. got 2,830 M.c.f. of gas and 260 ft. of gas-cut mud was recovered. Gas was also found in the Viola.

The drill entered the Bromide sand at 5,699 ft. Recovery was 470 ft. of oil and 180 ft. of oil-cut mud. Test in the upper part of the second Bromide sand was gas and a second test in the lower portion of the second sand flowed 2,520 M.c.f. of gas with recovery of 140 ft. of distillate-cut mud reported. The upper part of the third Bromide sand got 3,020 M.c.f. of gas. Recovery was 245 ft. of distillate-cut mud. A later test in the lower part of the third Bromide reported a flow of 2,930 M.c.f. of gas and recovery of 30 ft. of 63°-gravity distillate with 60 ft. of distillate-cut and gas-cut mud.

Garvin County . . . Stanolind Oil & Gas Co. has an important new pool at 1 Pitchlynn near Maysville in SE SW SE 14-4n-2w. The first Bromide sand strike flowed 12 bbl. per hour at 5,844-5,981 ft.

Grady Still Leads

This southwestern Oklahoma county still leads in over-all activity in the state. Phillips Petroleum Co. is exploiting five pay sands in the Ordovician rocks in the Bradley area. Chickasha field on the western side of the county is the other leading Grady area. Oil has been found in 32-3n-7w, making expansion of the producing area seem likely from 4n-8w and 5n-8w.

Northwest Oklahoma

J. R. McDermott has a discovery at 1 Murrow in 19-27n-16w, Woods County. The Mississippian discovery flowed 4,700 M.c.f. of gas per day plus 5 bbl. of distillate per million cubic feet. This gives the county its second producing area.

KANSAS

Phillips County Has New Oil Field

Jones, Shelburne & Farmer 1 Bales, NE NE SW 16-4s-19w, Phillips County, is a new oil discovery.

The wildcat made 3½ bbl. per hour from Lansing perforations. The well is 4 miles south and 7 west of Phillipsburg, Kans. It is southwest of Mont-Sol field.

New Gladys Field Gets Second Oil Producer

A new Mississippian field just south of Wichita in Sedgwick County has its second oil well. It is Dwight Shawver's 1 Slade, NE NE NW 31-28s-1e.

The well swabbed 50 bbl. per hour and pumping equipment is going up. The well is two locations south of the 1 Tyson, drilled by Beardmore Drilling Co. to open the field recently. Daily potential was 123 bbl. of oil at the discovery well.

Kingman Discovery Swabs Oil From Mississippian

Greenland Drilling Co. 1 Viney, NE NE NW 19-28s-5w, Kingman County well, swabbed 5-6 bbl. of oil per hour on a 6-hour test of the Mississippian. The wildcat prospect is 1½ miles west of Broadway field.

MICHIGAN

Small shows, of yet unknown significance, were logged in the past week at three widely scattered Michigan wildcat wells. Some of these showings may be significant in themselves while others may be more significant as indicators of what may be found later at these wells.

A show of Trenton oil was logged at 2,496-2,510 ft. at the McClure Oil Co. & Thomas B. Mask 1 Jennings, SE NW NW 22-5s-7e, London Township wildcat, Monroe County. Top of Trenton was logged at 2,415 ft. Hole carried only about 2 gal. of free oil and some water in 56 hours. Drilling was in progress below 2,570 ft., with no increase noted in porosity.

An interesting Montcalm County Dundee objective wildcat logged a show of gas in the Michigan Stray sand, but on the basis of its structural position, some geologists were disappointed in the quantity of gas reflected on drill-stem tests. This wildcat, E. Edwin Brehm 1 Jeppeson, NW SE NE 3-11n-7w, Douglas Township, showed for only 10,000 cu. ft. of gas on drill-stem tests run at 1,264-88 ft., and retested at 1,264-95 ft. However, if this wildcat should hold its structural advantage, as reflected on upper markers, it is

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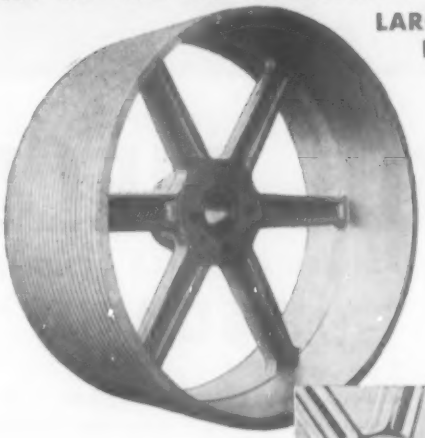

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rated as having an excellent prospect of finding oil in the Dundee.

The other wildcat reported to be carrying a small show of oil this week was the Devine & Lang Co. 1 Elenbaas, NW SW SW 34-9n-15w, Fruitport Township wildcat, Muskegon County. Wildcat was showing a small amount of oil in the Traverse lime objective at 1,806-07 ft. Top of Traverse was logged at 1,799 ft. Wildcat was shut down for orders at last report.

ILLINOIS

Illinois Drilling Continues At High Rate

Oil well completions in Illinois during October indicate that the year 1954 will be the fourth highest year of drilling in the state since oil was discovered in the Illinois basin in 1937, exceeded only by the peak years of 1939, 1940, and 1941. Oil production is running about 10 per cent above 1953 and will probably exceed that for any year since 1947. These predictions are based on data in the October Drilling Report which will be released November 12 by the State Geological Survey Division of the Department of Registration and Education.

Announcement was made of three new oil pools in October: Edinburg West in Christian County and Baldwin in Randolph County, both producing from the Silurian or Devonian, and Eldorado North in Saline County, producing from the Waltersburg sandstone. Edinburg West pool appears to be one of the best new pools discovered during 1954. It is located in the Mt. Auburn-Decatur area, one of the two most active areas in the state at the present time.

Extensions were completed to the following pools: Edinburg West and Blackland in Christian County, Ellery North in Edwards County, Clay City Consolidated in Jasper County, Roland Consolidated in Gallatin County, and Carmi, Epworth Consolidated, and Concord in White County.

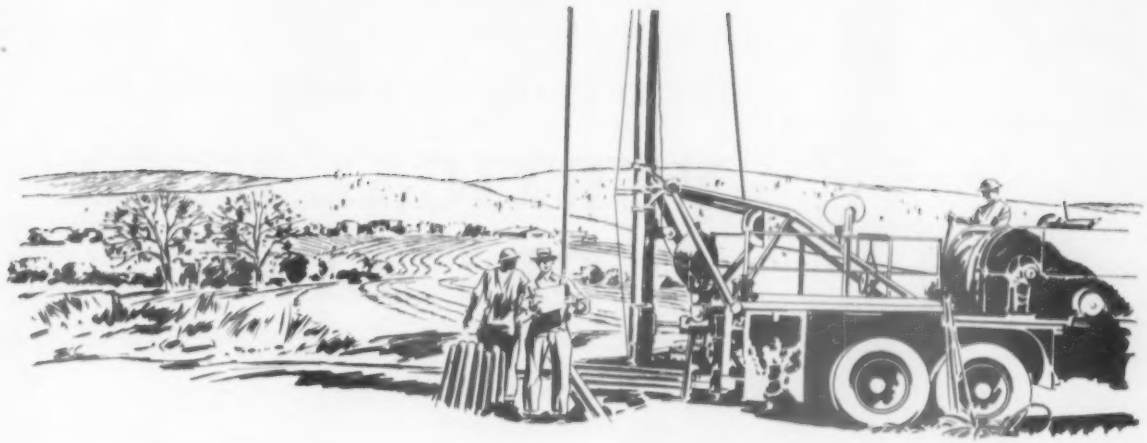
The Cypress sandstone was opened up as a new pay in Junction pool in Gallatin County and Norris City pool in White County. The first Pennsylvanian sandstone production was reported in Carmi pool in White County, and the first Rosiclare limestone production in Passport West pool in Clay County.

Estimated production for October was 5,757,000 bbl. Daily average production was about 186,000 bbl. in October, as compared with 182,000 bbl. in September.

A total of 329 wells were completed during the 5-week October period. This included 68 wildcats, 11 of which were successful, 166 oil wells in pools, and 1 small gas well.

October was remarkable for the large number of big Aux Vases wells completed. A 2,400-bbl. Aux Vases well in the New Harmony Consolidated pool is one of the biggest Aux Vases wells ever completed in the state. Nine other wells in the same pool were completed in the Aux Vases sand with initial productions between 140 and 750 bbl. In the Roland Consolidated pool in White County a 720-bbl. Aux Vases well was completed. Big Aux Vases wells were also reported in the Mill Shoals and Clay City Consolidated pools. These high initial productions result from fracture treatment of the Aux Vases sandstone, which is usually fine-grained and, as a result, has rather low initial productions without treatment.

In Christian County, Illinois' current most active county, Keystone Oil Co. 2 Fred Peters, NE NE NE 17-4n-3w, 8 miles northwest of Taylorville, is flowing more than 600 bbl. of oil per day natural through ⅞-in.



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choke. Pay zone is the Silurian at 1,652-59 ft.

This well is one of the best in the new good producing trend opened last January in the Christian-Sangamon-Macon County area.

A 5-mile wildcat in Marion County, the E. G. Walker 1 McKinney, NE NE SW 9-3n-4e, 10 miles northeast of Salem, is testing in the Benoist (Bethel) sand at 2,283-87 ft. A 1-hour drill-stem test in that zone recovered 420 ft. of gas, 190 ft. free oil and 75 ft. mud-cut oil, 30 ft. salt water. This wildcat opens a rather large new producing area.

A good flowing well has been completed in Hamilton County at C. E. Brehm 1 Casey, NE SE NE 5-7s-5e, 4 miles northeast of Thompsonville. The big oiler flowed 720 bbl. per day after fracturing from 3,183-3,211 ft. in the Aux Vases sand. It is ½ mile from production.

HUGOTON EMBAYMENT

The 1954 Discovery Rate Races To A Fast Finish

Wildcat developments in the Hugoton embayment continue to come up with significant discoveries.

Kansas . . . A new Morrow-Pennsylvanian gas field is assured in Clark County at Shamrock Oil & Gas Corp. 1 Stephens "H," SE SE 10-32s-21w, 3 miles southeast of Lexington and 2 miles northeast of an abandoned field.

On drill-stem test the wildcat surfaced gas in 1 minute at the rate of 8,800 M.c.f. per day. Recovery was 1 gal. of distillate. The new strike is 10 miles north of Harpers Ranch field, and 8 miles north of Sinclair Oil & Gas Co.'s recent Morrow gas discovery at 1 Combrink.

Second Permian Prospect In Recent Weeks Reported

The Texas Panhandle has its second Permian prospective discovery in recent weeks in the central part of Roberts County, 9 miles north of big Quinduno Permian brown dolomite field.

Cree Drilling Co. 1 Flowers-Shell-Flowers, Section 75, Block C, G&M Survey, had good gas shows on drill-stem test at 3,762-3,835 ft. Recovery was 300 ft. of heavily oil and gas-cut mud.

This is the second Permian prospect recently. Phillips Petroleum Co. 1 Ivy "A," Hutchinson County, flowed commercial amounts of gas on tests of the Permian white dolomite, but will be completed from Douglas and Marmaton pay zones.

Dallam County Field Will Get Potential As Confirmation

Confirmation to Dallam County, Texas' first producer will take potential. Humble 1 Kerrick Gas Unit 2 (Belo), 3 miles south of Kerrick in the northeastern part of the county, flowed 3,000 to 4,000 M.c.f. per day from upper Pennsylvanian lime.

Camrick Area Gets Major Gas Extension

Texas County, Oklahoma's Camrick-Grand Valley area has a gas extension assured at Carter Oil Co. 1 Gibson, SE NE 21-2n-19eCM, 2 miles northwest of Grand Valley field and 4 miles north of Camrick field.

The discovery got 5,690 M.c.f. per day with 2 gal. of distillate recovered. Production is from the Morrow sand. Near the main body of the field Carter has two other extension wells assured. Carter is also testing at a flank well in the area.

APPALACHIAN AREA

PENNSYLVANIA

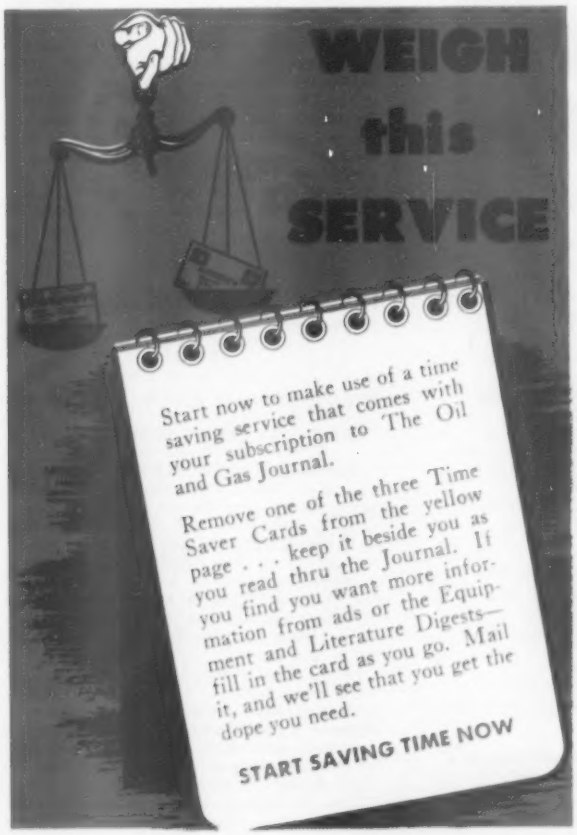
In Grant Township, Indiana County, Southwest Pennsylvania, Fairman Drilling Co. 1 Herb Gernandt, recorded the Oriskany sand at 7,665 ft., and is drilling at 7,674 ft., with no gas yet showing in this formation. In Banks Township, Keta Oil & Gas Co. et al 1802 Farmers & Miners Trust Co., reached the chert at 7,488 ft., and shut down at 7,498 ft., to run the 7-in. casing. Parker Township, Butler County, Walker et al 1 John Walker, is drilling at 7,220 ft.

WEST VIRGINIA

Walker district, Wood County, West Virginia, Hope Natural Gas Co. 9634 Power Oil Co., deep rank wildcat test is coring at 10,624 ft. At a depth of 10,439 ft., this well may have penetrated the Trenton lime. In Middle Fork district, Randolph County, P. C. McKenzie Co., Elk Horn Coal Corp., deep test is drilling at 7,126 ft.

OHIO

A second test by Frank Lyons et al on the Chas. Funk, Section 22, Perry Township, Coshocton County, a short distance north of West Carlisle, proved to be a gasser. Clinton sand at 3,048-97 ft. gaged 400,000 cu. ft.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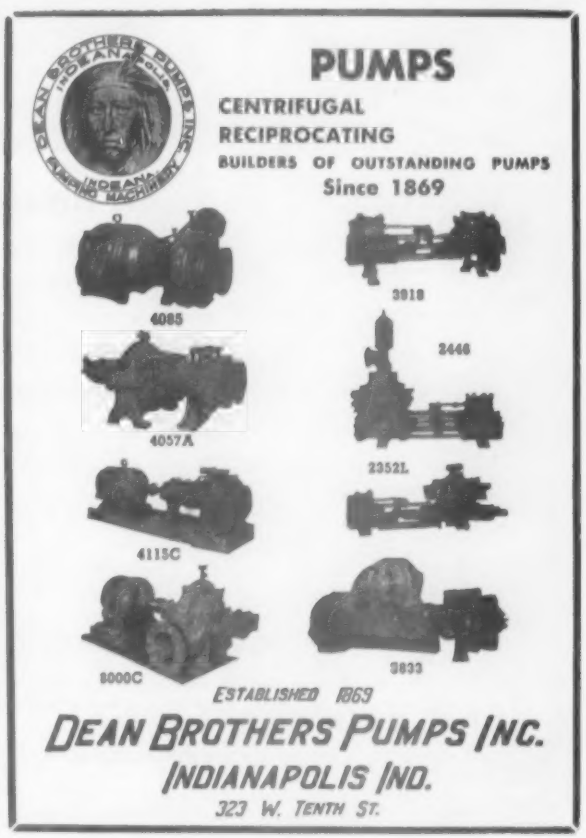


natural and 1,100,000 cu. ft. after fracturing.

The hard, fine grained second Berea sand responds to fracturing and a very good result was reported for the Grim Brothers 4 George Grim, Section 26, Lodi Township, Athens County. Sand at 1,698-1,713 ft. gaged 65,000 cu. ft. natural and 900,000 cu. ft. after treatment.

A second Oriskany sand test in Franklin Township, Coshocton County, is being drilled by Benedum-Trees on 1 Clyde Lapp.

KENTUCKY

EASTERN KENTUCKY

On Little Creek and in the Pike County sector of Big Sandy gas field, Kentucky West Virginia Gas Co. deepened 5647 Wilson Damron with good results. Well had originally produced from the Mississippian Maxon sand at 1,769 ft. and, upon drilling deeper to the Devonian black shale section 3,017 to 3,741 ft. total depth, gaged initially on open flow 391,000 cu. ft. of gas daily. Well was shot with 7,025 lb. of gelatin and a rock pressure of 545 psi. was recorded.

CALIFORNIA

Sunset Beach Well Testing

Atlantic Oil Co. 1 Ramser about ¾ mile southeast of Burt Aston's recent discovery at Sunset Beach, Orange County, appeared it might be successfully completed. After the interval 6,100-6,400 ft. had been perforated the test did not flow so that it was being swabbed at last reports. Location of 1 Ramser is in NW NW 29-5s-11w.

About midway between the two wells, but slightly north of a direct line, W. L. Meeker 1 Lomita Land recovered only gas on a formation test at 6,865-6,905 ft. After testing the operator cleaned out the hole preparatory to drilling deeper from 7,075 ft.

Humble Scores New Gas Discoveries

Humble Oil & Refining Co., which early in November completed a new gas field discovery in Colusa County, opened a new pool about 3 miles northeast of Beehive Bend field in Butte County. The latter discovery was 2 Parrott Investment Co., in SW NW 4-19n-1w. It flowed 4,000 M.c.f. daily through a ⅜-in. choke from perforations at 3,225-28 and 3,280-3,300 ft.

Humble's Colusa County discovery was 3 F. J. Steidlmayer in SE SE 3-15n-1w, about 8 miles west of Marysville Buttes field. It rated a potential of 1,700 M.c.f. through a ⅜-in. choke, with perforations at 1,378-1,415 ft. Both discoveries closely followed an extensive core-drilling program carried out last summer by Humble in northern Sacramento Valley.

North of Willows field in Glenn County, in 16-20n-3w, a Humble wildcat was setting a new depth record for this northern area. The test, 1 H. C. Fredericksen, was drilling below 12,450 ft. at last reports.

Between Beehive Bend and Princeton gas fields in Glenn County, A. J. Kennedy was attempting to complete 1 Torres as a new gas discovery. Drilled to 5,262 ft., the test was plugged back to 3,676 ft. and 5½-in. casing set at 3,023 ft.

Pipe Set At Wheeler Ridge

Richfield Oil Corp. was attempting to establish Eocene production at its wildcat 1½ miles southwest of Wheeler Ridge field, after having set 9⅝-in. casing at 8,487 ft. On a formation test at 11,237-11,363 ft., the well flowed salt water with a trace of oil at a 528-bbl. per day rate. This tended to verify electric log data indicating possible Eocene oil production at about 11,225-50 ft., with the lower portion of the sand being wet. Location of 2 San Emidio-B is in NE SW 21-11n-20w.

ROCKY MOUNTAIN

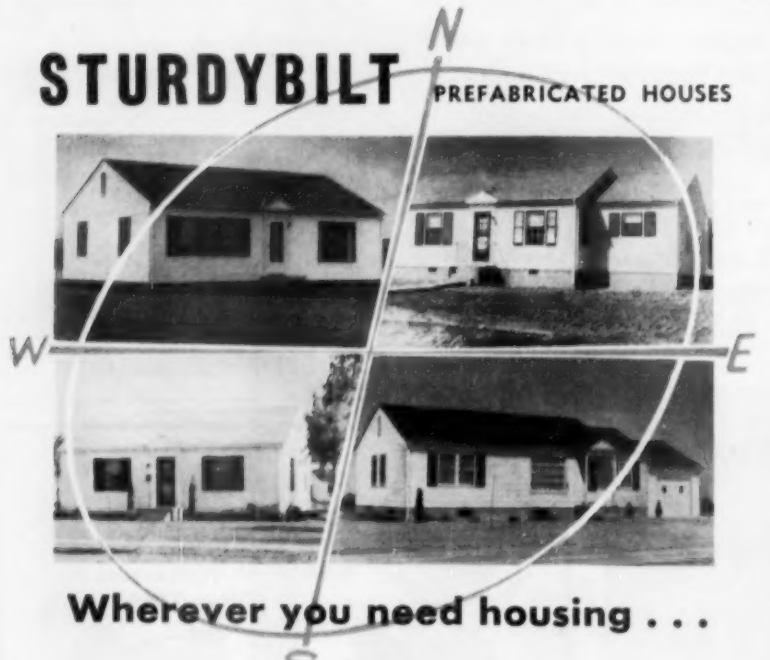
UTAH

Southeastern Utah Discovery Flows On New Tests

Shell Oil Co. has run additional successful tests at 2 Desert Creek, SE SE 35-41s-23e, San Juan County. On 3-hour test through 74/64-in. choke the well flowed at the rate of 1,150 bbl. of oil per day with tubing pressure of 95 psi. Tested for 2 hours on 14/64-in. choke, flow was at the rate of 214 bbl. per day with tubing pressure 350 psi. Shell has reported the well shut in for storage. With completion of erection of tanks testing will resume.

Initial tests of the wildcat were through perforations 5,244-72, 5,294-5,306 and 5,316-20 ft. Zero is the upper Paradox, and tests followed acidization of the dolomitic limestone formation. Recovery through 2-in. tubing on first reported test was 1,160 bbl. of fluid, of which 1,128 bbl. was oil.

The well is the second in the Desert Creek area for Shell. The first wildcat recovered



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only pinpoints of oil in mud recovered on drill-stem tests.

The general southeastern Utah area has been of considerable interest to a number of operators during the past several years. Shell has large leaseholdings in the Paradox basin, and has done a considerable amount of work in the area. Carter Oil Co. has also been active in exploration in the past 2 years.

There has been very little drilling done in the Paradox basin compared with other Rocky Mountain areas. The search conducted to date has regarded highly the possibility of Pennsylvanian reefing through the southeastern portion of the state.

Second Bluebell Unit Wildcat Recovers Oil

Carter Oil Co. recovered 2,790 ft. of 25°-gravity black oil with 450 ft. of highly oil-cut drilling fluid on test of 2 Bluebell Unit, C SW NW 3-1s-2w, Duchesne County. Test was in Green River in the interval 9,009-9,105 ft. Tool was open 4 hours. The formation was topped at 7,055 ft., and earlier drill-stem tests recovered gas at rates ranging up to 5,000 M.c.f. per day.

Carter is reported drilling below 9,100 ft. at the wildcat and will continue to a total depth of about 9,650 ft. The well is about 8 miles northwest of nearest production in Roosevelt field, Uintah County, which produces from Green River at about 9,000 ft.

First test of the Bluebell unit was made in 1951 when Carter drilled 1 Unit, C SW NE 6-1s-2w to a total depth of 12,518 ft. with noncommercial shows in Green River.

New Pay Tested At Chapita Wells

Continental Oil Co. recovered gas at the rate of 4,000 M.c.f. per day at 2 Chapita Wells Unit, NE NW SE 28-9s-23e, Uintah County. Recovery was from the Wasatch, which has not previously been productive in the unit. The discovery well drilled in 1952 produced oil with considerable volumes of gas from Mesaverde. Test at the current well was of the interval 5,060-5,115 ft. and flowing pressure at the end of the 3¾-hour test was 345 psi. Continental is drilling ahead at the apparent new pay discovery, which is 3 miles south of the Mesaverde discovery on the unit.

NEBRASKA

Two Kimball County Discoveries Completed

Two discoveries have been completed in Kimball County, adding to already successful 1954 exploration through the county. Tom Palmer, Inc. completed a "D" sand discovery at 1 Chaney, SW SW SW 27-13n-57w. The well pumped 240 bbl. of oil per day. Production is from 6,888-96 ft.

James P. Sloss reported a pump gage of 142 bbl. per day at 2 State, C NW NW 36-14n-55w. This discovery produced from J sand at 6,216-23½ ft.

COLORADO

Two Adams County Discoveries Completed

Ryan-Davis Oil Co. and Potter Drilling Co. have reported a flow of 480 bbl. of oil per day at completion of 1 Knox, SW SW SE 35-1s-59w, Adams County. The well produced from D sand. S. D. Johnson and Cosden Petroleum Company also reported a potential of 180 bbl. of oil per day, pumping at the Rosener field discovery. The well is 1 Rosener, SE SE SW 12-1s-59w.

Battleship Field Confirmation Spudded

Lion Oil Co. is drilling under surface pipe at 1 Kackelman, C NW NW 23-10n-79w, Jackson County. The well is a confirmation to Battleship field discovery, which was shut in after swab recovery of 185 bbl. of oil in 12½ hours. Production at the discovery is from Dakota.

GEOLOGICAL STRUCTURE MAP OF SAN JUAN BASIN IN COLORADO AND NEW MEXICO. Published by Austin Map Co., Bewley Bldg., Fort Worth 2, Tex. Price: paper, $15; cloth, $25.

The map covers southern Colorado and northern New Mexico. Key wells are shown with geological tops. It is contoured on the Dakota sandstone (Cretaceous) in the northern half of the map, and on the Kaibab limestone (Permian) on the southern half. Regional structures are clearly indicated as well as major producing areas of the region. The scale is 1-in. equals 8 miles.

Five Wildcat Successes Indicated In Week

The Denver-Julesburg basin area of the state had five wildcat report apparent discoveries during the past week. The most significant test to date on any of these was run by V. O. King and New Drilling Co. at 1-A Government, C SW NE 26-8n-

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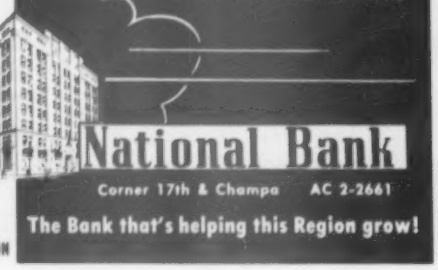

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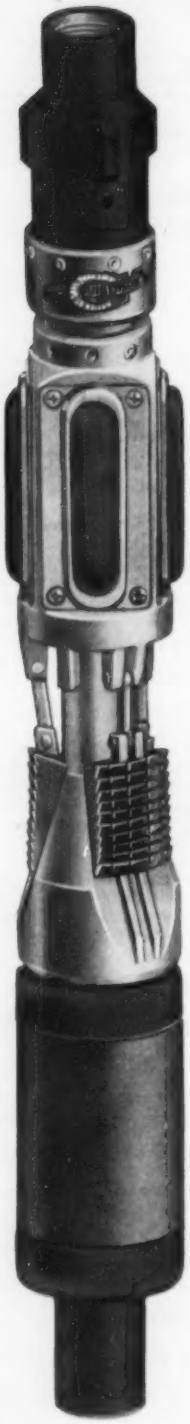

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56w, Weld County. A flow of 50 bbl. of oil per hour was gaged through ¾-in. choke. Test was through perforations at 5,760-64 ft. in J sand. A later test of the same zone, but on ¼-in. choke flowed at the rate of 17 bbl. per hour. The operators are continuing to test at the wildcat which is 5 miles west of Bonham field.

In Washington County, Alfred Ward and Sons, and Barnes and Brown recovered 800 ft. of oil in 1 hour test of J sand at 1 Gebauer, SE SE SE 4-1n-53w. Test was at 4,800-30 ft. Another test at 4,817-34 ft. recovered 800 ft. of oil with tool plugged after 1 hour. The operators are preparing to run casing. The well is 5 miles southwest of Rago.

At 1 Downing, NE NE NE 34-1s-56w, also in Washington County, Vaughey & Vaughey recovered 1,200 ft. of oil and 300 ft. of mud on test 5,057-97 ft. Tool was open 40 minutes, with flowing pressure at 275 psi. at the end of the test. There were no shows in J sand at this well which is 1½ miles southeast of Little Beaver field.

Two apparent discoveries were reported in Logan County. Ryan-Davis Oil Co. cored 13 ft. of porous, permeable saturated sand at 1-A Good, C SW SW 13-9n-54w, and is reported running drill-stem test of the interval 4,945-58 ft.

Strain Drilling recovered gas at a 6,000 M.c.f. per day rate at 1 Kaepernik, C SW NE 25-7n-53w. Test was at 4,387-4,433 ft. Flowing pressure at the end of the 25-minute test was 925 psi.

MONTANA

Powder River County Wildcat Has Reported Shows

Unofficial and unconfirmed reports in Montana have credited George J. Greer, Trustee, with a discovery in a slim hole test in Powder River County. A blowout at 3,160 ft. was reported from the well, in SW SW SE 24-1s-49e. Gas volume was estimated at 2,000 M.c.f. per day, with some recovery of distillate. The operator has run casing to 3,130 ft., according to reports. Gas recovery is believed to be from a Cretaceous sand, possibly Eagle. The well is reported as the third in a projected series of five slim hole tests in the area.

Reports have been neither confirmed nor denied by the operator. There has been no previous production in this portion of the Powder River basin, and commercial completion would stimulate new exploration in the Montana end of the basin. The well is about 20 miles north and west of the town of Broadus, in an area which has had almost no full hole drilling.

WYOMING

Discovery Completed In Natrona County

Stanolind Oil & Gas Co. has completed 1 Sherwood Unit, C SE NW 3-40n-77w, Natrona County for a flow of 83 bbl. of oil per day. Production is from Lakota. Perforations are at 11,017-32 ft. The well is about 5½ miles south of production at East Meadow Creek in Johnson County, and about 2 miles east of Salt Creek.

Confirmation Apparently Successful at Park Discovery

Mule Creek Oil Co. of Billings is testing an apparently successful confirmation well to its Tensleep discovery in the Big Polecat area, Park County. The well is 3 Unit, SE NE SW 16-57n-98w. Test in Tensleep at 5,383-5,411 ft. recovered 2,200 ft. of oil and 60 ft. of mud in 1 hour. Another test, also open 1 hour at 5,414-42 ft. recovered 2,080 ft. of oil and 180 ft. of mud-cut oil. The well is ¼ mile south of the discovery which was completed this year for 350 bbl. of oil per day.

Fourth Grieve Unit Well Located

Forest Oil Corp. has made location for a fourth test of the Grieve Unit, Natrona County. The well is 4 Unit, NW NW SE 22-32n-65w. The operator has tested a confirmation well at a rate of more than 1,000 bbl. per day, comparable to the flow from the discovery well, completed earlier this year. Producing formation has been identified only as Cretaceous. A third test, 3 Unit, C NE SW 28-32n-85w is drilling below 6,200 ft. and will go to basement.

Ralston Unit Phosphoria Discovery Completed

Sun Oil Co. has reported a flow of 252 bbl. of oil per day through 12/64-in. choke at 1 Ralston Unit, C NE NW Tract 51-56n-101w, Park County. Completion is in Phosphoria through perforations 12,640-80 ft. The well was a third Frontier discovery in 1953. At that time the original Madison objective was abandoned and the well completed in Frontier. Production decline resulted in decision to deepen to Madison, which was found nonproductive. The well was plugged back for Phosphoria completion.

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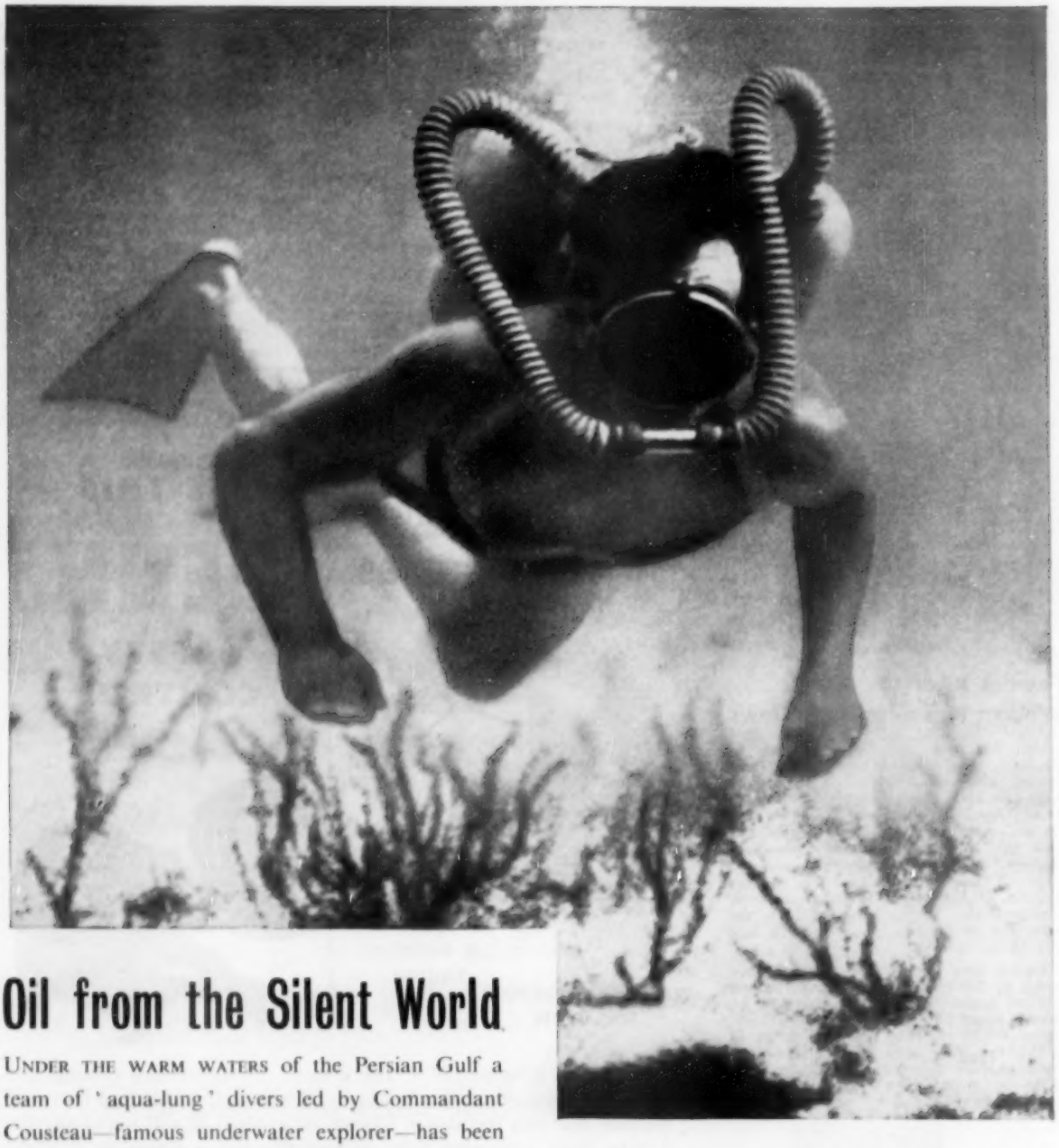

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Shallow Sand Produces In St. Martin Discovery

A shallow-sand oil-discovery has been made by Humble Oil & Refining Co. in the North American Island area, midway between West Lake Verret and Duck Lake fields, in St. Martin Parish. It is approximately 2 miles northwest of Humble's deep gas-condensate discovery well completed late in October.

The shallow-sand discovery well, 1-K Goodrich, produced at the rate of 105 bbl. of 26.2°-gravity oil per day through 3/16-in. choke, showing 120-psi. pressure. Pay zone, in Miocene sand, is perforated at 2,124-30 ft. Hole is plugged back to 3,000 ft. from its total depth of 12,556 ft.

The previously completed gas-condensate discovery-well, 1-J Goodrich, is perforated at 12,584-97 ft. with total depth at 13,053 ft.

Nearest production at West Lake Verret is approximately 3 miles to the northeast. Duck Lake field is toward the south.

New Offshore Field Gets Second Oil Confirmation

Shell Oil Co.'s third well in the new South Pass Block 23 area, 1½ miles southeast of the active and rapidly spreading Block 24 field, is being completed with a flow rate of more than 200 bbl. of 31.9°-gravity oil per day through 11/64-in. choke. Flow is with pressure of 900 psi. and gas-oil ratio of 705 cu. ft. per barrel. Production is from the 7,400-ft. Miocene sand, in which the two previous wells were completed. Perforated interval is 7,350-60 ft. Location is northeast of the discovery well, completed last August, and north of the first confirmation well, completed the latter part of September. The field is in the Gulf of Mexico off the south tip of the Mississippi River delta, Plaquemines Parish.

Bayou Long Production Moves Northwestward

Production in the new Bayou Long field, in St. Martin Parish, is being extended more than ½ mile northwestward from the discovery well at the field's third producer, now being completed by Continental Oil Co. Continental's second well, completed last month, is 2,250 ft. northeast of the initial well.

The new well, 3-B Jeanerette, flowed 52 bbl. of condensate with 3,165,000 cu. ft. of gas per day on tests through 12/64-in. choke from Miocene sand at 12,112-148 ft. Operators plan to complete the well dually, taking in a shallower sand, perforated at 11,857-90 ft.

The discovery well, completed early this year, produces oil from sand at 11,930-40 ft., and gas-condensate from sand at 12,182-203 ft. The second well was completed with gas-condensate production from sand at 12,366-76 ft.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

District 1

Atascosa County: Plymouth Oil Co. 3 Bob Hindes, Luke Bryan Sur. 239, A-104. IPP 67/98 BOPD, 18.6°, open hole 2,093-2,102 ft. TD 2,102 ft. (New field—Bob Hindes.)

Frio County: J. C. McCabe et al 1 Oppenheimer & Lang, Sec. 12, Hawkeye Cattle Co. Sur., A-1002. Dry. TD 5,174 ft.

Gonzales County: O. Neathery, Jr. 1 Simmons, A. B. Dillard Sur. (Stulting area). Dry. TD 2,127 ft.

Guadalupe County: James H. Eddy 1 Blanks, Richard Nixon Sur. Dry. TD 3,391 ft. Producers Corp. of Nevada 1 Blume, John G. King Sur., A-26. Dry. TD 2,457 ft.

McMullen County: Alaska Steamship Co. and Newman Brothers Drilling Co. 2 Donnell, William Herritage Sur. 10, A-1076. Dry. TD 6,222 ft.

District 4

Brooks County: H. L. Hunt, Jr., trust estate, 2 Gage et al, T.&M. Sur. 701, A-583. Dry. TD 6,224 ft.

Duval County: A. W. Gregg Drilling Co. 1 Canales, Sec. 17, Spring Creek Irrigation Co. Sur., A-751. IP 118.5 BOPD, 10/64-in., 49.4°, Pettus sand 4,715-24 ft. (perforations). TD 4,725 ft. (New field—La Juana.)

Hidalgo County: Kirkwood & Co. and George H. Coates et al 1 Turner, Block 19, Valley Farms Subd. Dry. TD 7,515 ft.

Jim Wells County: Max Pray 3 Banker, Block 50, W. H. Sartain & Co. Subd., J. Fadden Sur., A-145. Dry. TD 7,612 ft.

Nueces County: Carrl Oil Co. and C. L. Rowan 1 Salyer, Block 13, Garrett Subd. of Bagnall Tracts, Share 3, Collins Petronilla Subd. Dry. TD 7,515 ft.

Texas Southern Oil & Gas Co. 1 Rambo, Bishop & Blocker Sur. Dry. TD 5,010 ft.

Starr County: Clark Fuel Producing Co. 2 Salinas, Tract 3, Dan L. Clark Subd., Block 24, Porcion 110. Dry. TD 2,403 ft.

R & T Producing Co. 1 Tijerina, Block 12, Share 14-C, Porcions 80 and 81 (Theljohn area). Dry. TD 1,397 ft.

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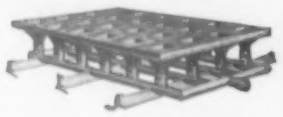

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WILDCAT COMPLETIONS

Sun Oil Co. 1-C C. C. de Lopez, TTRR Sur. 481. Dry. TD 6,247 ft.

R & S Oil Co. 1 Guerra et al, Share 2 and 3, Survey 341, IP 4,100 M.c.f. daily (estimated), open flow, perforations 2,750-56 ft. TD 3,520 ft. (New field.)

Zapata County: Magnolia Petroleum Co. 1 Leonard Haynes estate, Block 8, Subd. of Comitas & Villa Grant. Dry. TD 2,505 ft.

TEXAS GULF COAST

District 2

Jackson County: Bass & Vessels 1 Robertson, Lot 22, Pickering Ranch Subd., P. Scott Sur., A-69. Dry. TD 6,706 ft.

Inca Drilling Co. 1 Lundquist, Lot 3, Rainey-Robinson Subd., George House Sur., A-34. Dry. TD 6,500 ft.

Live Oak County: H. C. Rix 2 Marston et al, John Turner Sur., A-38. Dry. TD 800 ft.

Texita Oil Co. et al 1-B Maggie McNeill est., John R. Francis Sur. 2, A-183. Dry. TD 4,650 ft.

Refugio County: Field Drilling Co. et al 1 James F. Welder heirs, J. Power and J. Howetson Sur., A-54. IP 128.59 BOPD, 7/64-in., 30°, Frio 5,796-5,802 ft. (perforations). TD 6,107 ft. (New field—Vidauri.)

J. S. Michael 1 James F. Welder heirs, James Power and J. Hewetson Sur., A-54. Dry. TD 6,425 ft.

Victoria County: La Gorce Oil Co. 1-C Musselman, I&GN Sur. 59, A-221. Dry. TD 4,520 ft.

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District 3

Colorado County: Slick Oil Co., Ltd., 1 McLane, I&GN Sur. 42, A-293. Dry. TD 6,485 ft.

Galveston County: Ada Oil Co. 1 Blume, Block 39, San Leon Farm Homes Tract, A. Edwards Sur., A-10. Dry. TD 9,527 ft.

Jefferson County: Pat W. Brady and Clegg & Hunt et al 1 Doornbos, Lot 5, Block 9-K, Port Arthur Land Co., Subd., William Kyle Sur., A-413. Dry. TD 9,368 ft.

Matagorda County: British-American Oil Producing Co. 1 Buckner's Orphans Home, James Moore Sur., A-62. Dry. TD 11,310 ft.

P. R. Rutherford and Houston Oil Co. of Texas 1-A Trull, Lot 5, William Hathaway Sur., A-484. Dry. TD 11,700 ft.

EAST TEXAS

Cherokee County: D. D. Feldman 1 Taylor, R. P. Brown Sur., A-115. Dry. TD 5,100 ft.

Falls County: Iowa Oil & Refining Co. 1 Avery, Pedro Zarza Sur. Dry. TD 999 ft.

Freestone County: Humble Oil & Refining Co. 1 Gehrels, M. Autrey Sur., A-45, 11 mi. SE Fairfield. IP 7,400 M.f.g., open flow, GLR 1,770, 55°, Rodessa 8,196-8,208, 8,224-30 ft. SIP 3,239 psi. TD 9,132 ft.

WEST CENTRAL TEXAS

Callahan County: Elm Oil Co. 1 McClure, H. Mascrop Sur. 15. Dry. TD 4,246 ft. Elev. 1,973 ft., Ellenburger 4,113 ft.

Sorrels Oil Co. 1 Cutbirth, M. J. Webb Sur. 2. Dry. TD 2,366 ft.

Coleman County: Dobbs & Tesch 1-A Morris, 30-2-GH&H. Dry. TD 2,615 ft.

Bert Fields 1 Bowen, R. S. Bowen Sur. 2, 4½ mi. W Coleman. IP 153 BO in 9 hr., 6/64-in., 41°, TP 140 psi., GOR 650, Mossir sand 2,584-94 ft. TD 2,956 ft.

C. M. Jones 1 Fender, Blk. 117, W. H. Bynum Sur. 272. Dry. TD 1,902 ft.

W. H. McGarr Industries, Inc. 1 Neff, Bradford Sur. 485, 4 mi. E Coleman. IP 20½ BOPD, 16/64-in., 42°, TP 25 psi., GOR 412, Capps lime 2,170 ft. TD 2,195 ft.

Parker County: Ben J. Taylor 1 Carr, Sec. 30, L. C. Sullivan Sur., 12 mi. N Weatherford. IP 144 BOPD, 42°, 5/16-in., TP 300 psi., GOR 1,170, lower Strawn sand 3,110-20 ft. TD 5,087 ft.

Shackelford County: Murray E. Body 1 Dyer, 73-12-T&P. Dry. TD 4,593 ft.

Hill & Hill 1 Bossie, Sec. 28, D&SE Sur. Dry. TD 5,318 ft.

Marshall R. Young 3-A Cook, Sec. 81, ETRR Sur. Dry. TD 3,077 ft.

Marshall R. Young 72-A Cook, Sec. 61, ETRR. Dry. TD 3,298 ft.

Throckmorton County: Mid-Continent Petroleum Corp. 1 Carpenter, Sec. 227, BBB&C Sur., A-137. Dry. TD 5,230 ft.

NORTH TEXAS

Archer County: Autry & Eshleman 1 Andrews-Wolfe, SPRR Sur., A-1300. Dry. TD 1,402 ft.

A. R. Dillard 1 Nix, Sec. 2, SPRR Sur., A-1102, 1 mi. NE Mankins. IPP 71 BOPD, 40°, pay 4,318 ft. TD 4,323 ft.

H. H. Fraser 1 Albers, Blk. 118, J. W. Harris Subd. IPP 30 BOPD, 37°, pay 1,091 ft. TD 1,298 ft.

Baylor County: Burt Oil Co. 1 Syptak, Sec. 200, T&NO Sur. Dry. TD 5,819 ft. Elev. 1,305 ft., Mississippian 5,819 ft.

Tres Oil Co. 1-A Hunt, Blk. 27, J. Gardner Sur. Dry. TD 1,577 ft.

West Central Drilling Co. 1 Storek, Sec. 78, T&NO Sur. Dry. TD 1,805 ft.

Clay County: L. T. Burns 3 Mayfield, TE&L Sur. 3220, AO581. Dry. TD 4,550 ft.

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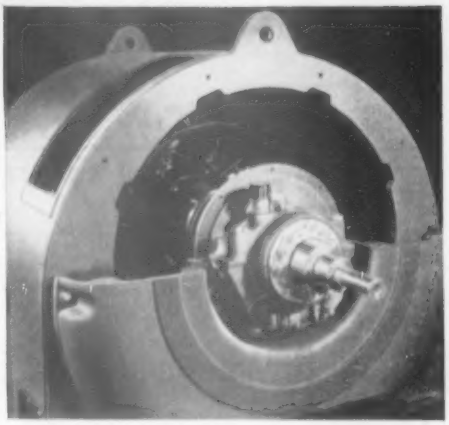

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ALLIS-CHALMERS LARGE SIZE SYNCHRONOUS AND WOUND-ROTOR MOTORS have been completely redesigned with longer stator yokes and shorter end shields. Collectors and brushes are located inside the yoke for protection against physical damage, dripping moisture, dust and dirt.

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All leads enclosed — Both primary and secondary winding leads are brought out through separate conduit boxes. There is no loose wiring . . . no exposed leads anywhere.

Easy maintenance — Even though the new design offers maximum protection to brushes and collectors, internal parts are fully accessible for inspection and maintenance through large openings in the stator yoke. Opening covers are readily removed and are secured during operation by easy-operating, self-locking fasteners.

Get details now — This new design is available from approximately 250 hp at 300 rpm and up, in drip-proof and splash-proof construction. Call your Allis-Chalmers representative for complete details or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183. A 4464

ALLIS-CHALMERS

WILDCAT COMPLETIONS

George S. Hammonds 1-A Edwards, Sec. 10, MEP&P Sur., A-356. Dry. TD 6,850 ft. Elev. 919 ft. ground, Ellenburger 6,656 ft.

Taubert & Harper 1 Stine, Blk. 65, Bacon Subd. Dry. TD 976 ft.

Cooke County: Bridwell Oil Co. 2 Judy, J. Russell Sur., A-862, 4 mi. NE Gainesville. IPP 78 BOPD, 28°, pay 3,282 ft. TD 3,286 ft.

W. P. Luse 1 Lynch, H. W. Crawford Sur., A-1346. Dry. TD 5,128 ft.

Lynn & Russell 1 Clear, Blk. 23, G. Ivy Sur., A-516. Dry. TD 856 ft.

Grayson County: Shell Oil Co. 1 Brown, J. W. Vanderen Sur., A-1295, 2 mi. S Pottsboro. IP 252 BOPD, 32/64-in., 34°, TP 100 psi., GOR zero, top Baker sand pay 7,515 ft. TD 8,500 ft.

Jack County: F. Kirk Johnson 1 Duckworth, E. Price Sur., A-472. Dry. TD 5,306 ft.

Russell Maguire 1 Terry, B. F. Terry Sur., A-611. Dry. TD 5,256 ft.

J. C. Man 1 Carter, TE&L Sur. 3306. Dry. TD 3,476 ft.

Knox County: Ernestine Callihan 1 Holder, Sec. 21, D&W Sur., A-506. Dry. TD 1,856 ft.

Lester & Duffield, Inc. and Plymouth Oil Co. 1 Bohannan, 92-2-D&W. Dry. TD 5,951 ft.

Young County: Brown Drilling Co. BM-1 Graham, TE&L Sur. 3410, A-1210, 11 mi. W Graham. IPP 24 BOPD, 41°, Strawn pay 2,668 ft. TD 2,673 ft.

M & S Drilling Co. 2 Manning estate, TE&L Sur. 3412, A-1232, Blk. 6. Dry. TD 2,720 ft.

Peterson & Gordon 1 Blount, TE&L Sur. 2692, A-1131. Dry. TD 3,654 ft.

SOUTHEAST NEW MEXICO

Lea County: Continental Oil Co. 1-35 Fisher, 35-20s-38e. IP 98 BOPD, 16/64-in., top Abo pay 7,250 ft. TD 9,587 ft.

WEST TEXAS

Crane County: J. E. Moran 1 Raymond Reed, 10-4-H&TC, 8 mi. N Imperial. IP 150 BOPD, 16/64-in., TP 250 psi., GOR 700, 40°, pay 5,790 ft., perforated 5,790-5,844 ft. TD 6,555 ft.

Garza County: Headwaters Oil Co. 1 Storie, Sec. 1303, EL&RR Sur., A-360. Dry. TD 4,472 ft.

LaGorce Oil Co. 1 Franklin, Sec. 1246, AB&M Sur., 11 mi. NW Post. IPP 108 BOPD, 38°, pay 3,573 ft. TD 4,224 ft.

Western Drilling Co. 1 Boren, 104-5-H&GN, 8 mi. NE Justiceburg. IPP 15 BOPD, 34°, pay 2,536 ft. TD 2,774 ft.

Hockley County: Great Western Drilling Co. 1 Bean, 2-A-PSL Sur., Tract 7, 4 mi. E Levelland. Dry. TD 10,099 ft. Canyon 9,692 ft., Strawn 10,054 ft.

Terry County: Midwest Oil Corp. and White Eagle Oil Co. 1 Guetersloh, 20-C37-PSL, 10 mi. S Brownfield. IP 365 BOPD, 14/16-in., TP 150 psi., GOR 748, 42°, perforated Wolfcamp reef 8,846-64 ft. TD 8,940 ft.

Tom Green County: W. A. Stockard 1 Jones, SA&MG Sur., A-1956. Dry. TD 6,499 ft. Elev. 2,040 ft., Strawn lime 5,620 ft.

Winkler County: J. C. Barnes & C. V. Lyman 1 Kerr, 26-B5-PSL, 5 mi. SW Kermit. IP 160,000 M.c.f., plus 2,424 bbl. 58° distillate, 20/64-in. choke, Ellenburger 11,480-11,525 ft. TD 11,662 ft.

Yoakum County: Oceanic Oil Co. et al 1 Graham, Sec. 268, Blk. D, J. H. Gibson Sur. Dry. TD 12,850 ft. Elev. 3,633 ft. Devonian 12,583 ft.

WEST TEXAS BORDER COUNTIES

Nolan County: General Crude Oil Co. 1 Faust, 37-23-T&P. Dry. TD 7,500 ft. Elev. 2,383 ft., Ellenburger 6,967 ft.

Roark-Hooker-Chicago Corp. 1 Payne, 31-19-T&P, 3 mi. NW Trent. IP 153 BOPD ¼-in., 48°, TP 280 psi., GOR 1,385, pay, 5,486 ft. TP 5,585 ft.

Runnels County: Geochemical Surveys and J. J. Coyle 2 Vogelsang, Blk. 167, ETRR Sur. Dry. TD 2,552 ft.

IOWA

Dallas County: Northern Natural 1 Maher, SE SE NE 1-79n-29w. Gas storage well.

1 Davis, C S½ SE NW 12-79n-29w. Gas storage well.

1 Nelson, NW SE SW 12-79n-29w. Gas storage well. TD 2,841 ft.

ILLINOIS

Christian County: Niemann et al 1 McVoy, SE NE SE 2-15n-1w. IPP 137 BOPD, Silurian 1,888-1,910 ft. TD 1,918 ft. (Extends Blackland field.)

Clay County: D. Baines 1 McConnell et al, SW NE NE 24-4n-6e. Dry. TD 2,977 ft.

Clinton County: Shulman Bros. Kleysteuber, SW NW NE 34-3n-1w. Dry. TD 2,876 ft.

Edgar County: W. W. Henigman 1 Houston, SW SW SE 9-14n-12w. Dry. TD 453 ft.

Jasper County: R. Harrell et al 1 Kitcher, SE SE SE 1-7n-10e. Dry. TD 2,410 ft.

Skiles Oil Corp. 1 Ochs, NE NE SW 28-7n-10e. IPP 24 BOPD, 2,773-82 ft. TD 2,853 ft. (Oil discovery.)

Lawrence County D. Lambert 1 Busse, SE SW SW 23-4n-12w. Dry. TD 1,826 ft.

Macon County: N. H. Richardson 1 Greenberg, SW SW NW 33-17n-4e. Dry. TD 2,361 ft.

Moultrie County: L. Younger, Jr. 1 Fulk, SW SW NW 10-14n-4e. Dry. TD 2,767 ft.

Randolph County: Jet Oil Co. 1 Patterson, SW SW NE 7-4s-6w. Dry. TD 2,005 ft.

Jet Oil Co. 2 Rogers, NE NE SW 7-4s-6w. Dry. TD 1,850 ft.

Washington County: J. L. Wilhite 1 Madolski, SW SW NE 15-2s-1w. Dry. TD 1,638 ft.

White County: Sun Oil Co. 1 Williams, SE SE SE 23-3s-9e. Dry. TD 3,405 ft.

INDIANA

DuBois County: Luthe-McDowell 1 Frick, SE SW NW 15-2s-5w. Dry. TD 1,401 ft.

Owen County: Burgin & Coon 1-A Jordan, SW SW SW 27-12n-3w. Dry. TD 500 ft.

Spencer County: Mullinax & Gale 1 Snyder, SE SE SE 34-4s-4w. Dry. TD 915 ft.

Sullivan County: F. B. Cline 1 Milam, NW SE NW 4-7n-9w. Dry. TD 1,209 ft.

1 McHugh, NE NW NW 35-9n-9w. Dry. TD 1,544 ft.

Vanderburg County: Felmont Oil Corp. 1 B. Hille et al, SE SW SE 8-8s-11w. Dry. TD 2,660 ft.

Vigo County: Great Lakes Carbon Corp. 1 Miller, NW NW NW 10-10n-9w. Dry. TD 1,217 ft.

Warrick County: E. H. Stratton 1 Springston, NE NW SW 5-4s-6w. Dry. TD 1,410 ft.

KENTUCKY

Christian County: Mount Carmel Drilling Co. 1 McBride, SE SW SW 1-G-24. Dry. TD 1,226 ft.

Stanoco 1 Bartlett-Kington, SE SW SW 9-H-26. Dry. TD 1,849 ft.

Daviess County: Felmont Oil Corp. et al 1 Saint Joseph Academy, NE NE SW 16-O-27. Dry. TD 2,348 ft.

McLean County: Hupp Oil Co. 1 Whitmer, NW NW SW 2-K-27. Dry. TD 2,514 ft.

Muhlenberg County: F. W. Rowe 1 Wickliffe, NW SE SW 7-H-28. Dry. TD 1,575 ft.

Adams Petroleum Co. 2 (3) McKinney, SE SW NW 15-H-30. Dry. TD 804 ft.

This announcement appears for purposes of record.

Union Sulphur and Oil Corporation

134,304 Shares, Class A Stock
(Non-Voting, $1 par value)

87,152 Shares, Class B Stock
(Voting, $1 par value)

These shares have been sold by the undersigned on behalf of certain selling stockholders.

Dillon, Read & Co. Inc.

November 4, 1954

WILDCAT COMPLETIONS

Union County: Buchman-O'Neal-Basin 1 Robinson Estate, SE SE NW 9-N-19. Dry. TD 2,569 ft.

Vandenbark & McGuire 2 Logsdon, NW NE SE 10-O-17. Dry. TD 2,737 ft.

Ryan Oil Co. 1 Roberts, SE NW NE 7-O-20. IPP 16, "C" sand 2,283-87 ft., 2,302-08 ft. TD 2,700 ft. New pay at Chapman field.

MICHIGAN

Bay County: Frank E. Roush 1 Pilat, NE NW NE 20-18n-3e. Dry. TD 3,200 ft. in Dundee.

Livingston County: W. W. Wicklund 1 Smith, NW SE SW 12-1n-8e. Dry. TD 5,200 ft. in Trenton.

Oakland County: Alan S. Gray & Ray Whyte 1 Leone, SW SW NE 29-1n-8e. Dry. TD 5,452 ft. in Trenton.

Ottawa County: Miller Brothers 1 Bos, NW NW SW 21-5n-14w. Dry. TD 1,681 ft. in Traverse lime.

Van Buren County: Ford Oil Co. 1 MacKellar, SE NW NW 36-4s-14w. Dry. TD 2,785 ft. in Trenton.

Washtenaw County: H. E. Walton 1 Noble, SW SE SW 13-1s-7e. Dry. TD 4,684 ft. in Trenton.

ALABAMA

Choctaw County: Gulf Refining Co. 1 Mahaley Du Bose et al, SW SE 7-9n-3w. Dry. TD 5,647 ft. Elev. 210 ft., Lower Cretaceous 5,162 ft.

Clarke County: Sun Oil Co. 1 Perine, SW SW 25-5n-3e. Dry. TD 5,584 ft. Elev. 38 ft., lower Tuscaloosa 5,233 ft.

Marshall County: W. P. Young 1 Black, W½ SE NW 22-7s-1e. Dry. TD 823 ft.

MISSISSIPPI

Adams County: Serio-Punches Oil Co. and Billips Brothers 1 Board of Supervisors, 16-5n-1w. Dry. Elev. 218 ft., Wilcox 4,568 ft., base Baker shale 6,373 ft.

Copiah County: Gulf Refining Co. 1 Purser et al, C NW SE 15-1n-3w. Dry. TD 15,224 ft., Lower Cretaceous 10,110 ft., Hosston 14,819 ft.

George County: La Rue et al 1 Board of Supervisors, C SE SE 16-2s-6w. Junked. TD 8,316 ft.

Jefferson County: S. C. Callon 1 Bernhardt Strass et al, 31-8n-1e. Dry. TD 6,510 ft. Elev. 277 ft., Wilcox 3,917 ft., base Baker shale 5,763 ft.

Kemper County: Roy A. Lamb and A. G. Galt 1 Smith, 1-9n-17e. Dry. TD 3,198 ft. Elev. 216 ft., LLower Cretaceous 2,619 ft.

Pontotoc County: L. E. Salmon 1 J. I. Wilson est., SE NE NW 29-9s-3e. Dry. TD 4,504 ft.

NORTH LOUISIANA

Concordia Parish: Serio-Punches Oil Co. 1 Calvert, C W½ NE SE 24-7n-7e. Dry. TD 5,700 ft.

Carter Oil Co. 1 Fisher Lumber Corp., C NE SW 11-7n-8e. Dry. TD 6,000 ft.

E. C. Wentworth and Clinch Drilling Co. 1 Wilerson, 13-7n-6e. Dry. TD 5,504 ft. West outpost to Wildsville field.

DeSoto Parish: McAlester Fuel Co. and S. Stuart A-1 Sourlock, 22-12n-14w. IP 1,470 M.c.f. of gas per day, 1½ BCPD, ¼-in., Paluxy 2,946-64 ft., 59.8°. TD 2,992 ft. (New pay for Spider field.)

LaSalle Parish: Magnolia Petroleum Co. 2 Urania Lumber Co., 1-10n-1e. Dry. TD 3,850 ft. Strat test.

Richland Parish: Monla Gas Co., Inc. and Feazel Interests 1 Stringfellow, 8-17n-6e. Dry. TD 2,644 ft.

OKLAHOMA

Beaver County: Cabot Carbon Corp. 1 Barby "A," C NW NW 1-4n-25eCM. Dry. TD 7,180 ft.

United Producing Co. 1 Evans, C NW SW 8-5n-25eCM. IPF 14 BD per million, 20,200 M.c.f. of gas per day, Miss. 6,894-6,924 ft. TD 7,025 ft. (Distillate discovery.)

Carter County: Peppers Refining Co. 1 Departmental, NW NW NW 3-3s-2w. Dry. TD 8,551 ft.

Comanche County: Albert Beck 1 Smith, NW NW NW 10-1n-12w. Dry. TD 1,451 ft.

Garfield County: G. C. Lizar et al 1 Gorton, NW SW NW 35-23n-3w. Dry. TD 2,317 ft.

Jackson County: Roy Brown 1 Holmes, NE SE NW 27-1s-20w. Dry. TD 1,501 ft.

Jefferson County: Woodward & Co. 1 Dillard, NE NE NE 36-4s-4w. Dry. TD 7,164 ft.

Kay County: Gulf Oil Corp. 1 Spore, NE NE SE 11-28n-2e. Dry. TD 3,565 ft.

Dave Morgan Oil Co. 1 Casey, NE NE SW 34-28n-4e. Dry. TD 3,313 ft.

E. T. Lindsay 1 Olsen, NW NW SE 33-29n-5e. Dry. TD 3,200 ft.

Lincoln County: Lee Evans Drilling Co. 1 Cunningham, SW SW SW 29-15n-4e. IP 1,700 M.c.f. of gas per day, lower Skinner sand 4,102-12 ft., 20/64-in. TD 4,312 ft. (Gas discovery.)

Roland S. Bond, Jr. 1 Bell, NW NW NE 12-16n-2e. Dry. TD 4,939 ft.

McClain County: Amerada Petroleum Corp. 1 Cline, NE NE NE 14-5n-3e. Dry. TD 3,702 ft.

Noble County: Nadel & Gussman-Portable Drilling Co. 1 State, NW NW SW 13-21n-3e. Dry. TD 3,743 ft.

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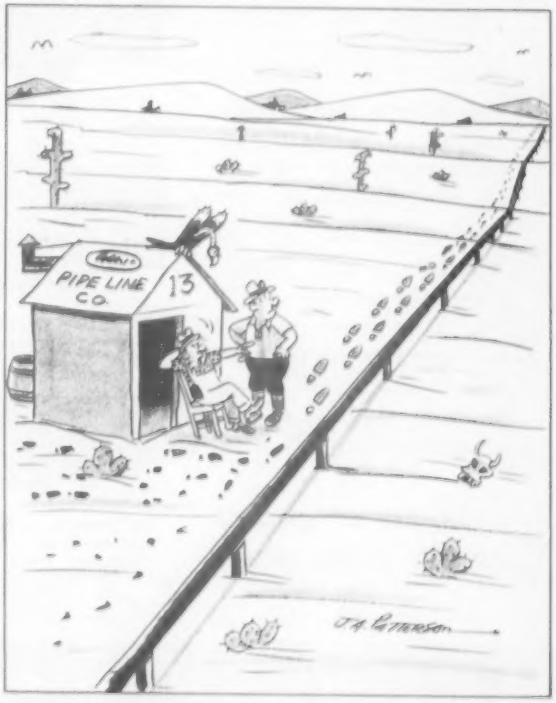

THE OIL AND GAS JOURNAL

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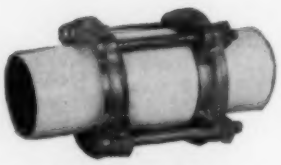
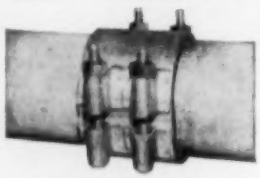
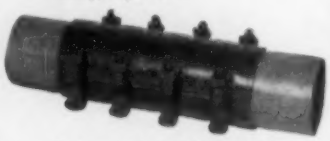


For leaks through threads of screw collars. *Collar Clamps,* Styles 4 and 41.

For leaks and holes in run of pipe. *Band Clamp,* Style 77B.



For repairing leaks in asbestos cement pipe. *Hydrepair* Clamp,* Style 179.



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WILDCAT COMPLETIONS

Okfuskee County: K&H Drilling Co. 1 Replogle, NE NW NE 27-12n-7e. Dry. TD 4,776 ft.

Osage County: Oliphant 1 Osage, NW NW SE 12-25n-3e. IPF 252 BOPD Layton, 2,555-66½ ft., 40°, ½-in. TD 3,556 ft. (Oil discovery.)

Ottawa County: C. W. Thrall 1 Davis, SW NE NW 13-27n-23e. IPP 4 BOPD, Arbuckle 380-393 ft. TD 600 ft. (First production for the county.)

Payne County: D&L Oil Co.-Ryan Oil Co. 1 Lantz, NW NW NW 6-17n-1e. Dry. TD 5,475 ft.

LaGorce Oil Co. 1 Newsom, SE NW NW 2-20n-3e. Dry. TD 4,404 ft.

Pottawatomie County: Texinia Corp. 1 Hall, NE SE SE 7-10n-5e. Dry. TD 4,814 ft.

Rogers County: Allen A. Borton 1 Miller, SW SE SW 1-24n-15e. Dry. TD 1,178 ft.

Tulsa County: J. W. Gallagher 1 Heinrich, SE SE NW 12-22n-13e. Dry. TD 1,330 ft.

Woods County: Otha V. York and Associates 1 Murrow, C SW NE 19-27n-16w. IPF 11,422 M.c.f. of gas per day, 57 bbl. distillate per million, Miss. 5,750-80 ft., open. TD 7,238 ft. (Distillate discovery.)

MISSOURI

Nodaway County: O. O. Wallace 1 Jackson, NW NW NE 25-65n-34w. Dry. TD 1,820 ft.

KANSAS

Barber County: Anschutz Drilling Co. 1 Knackstedt, NE NE SE 7-30s-13w. Dry. TD 730 ft.

Aylward Drilling Co. et al 1 Mease, NE NE SW 27-30s-11w. IP 5,000 M.c.f. of gas per day, Douglas 3,759-69 ft. TD 3,769 ft. (Opens Mease pool.)

Orville Parker 1 Chain, SE SE SE 21-31s-11w. IP 2,422 M.c.f. per day, Douglas 3,749-56 ft. TD 4,531 ft. (Opens East Whelan pool.)

Musgrove 1 Gillispie, NE NW SE 15-32s-12w. Dry. TD 4,430 ft.

Barton County: Kantor Oil Co. 1 Brown, SE SE SE 16-18s-14w. Dry. TD 3,478 ft.

Chase County: Evans-Yearout et al 4 Crosby, NE NW SW 23-22s-9e. Dry. TD 2,421 ft.

Ellis County: Morrison Drilling Co. et al 1-A Schumacher, SE SE SE 1-14s-18w. Dry. TD 3,682 ft.

Graham County: Schermerhorn 1 Newell, SE NW NW 27-8s-21w. IPP 166 BOPD, Lansing 3,387-93 ft. TD 3,690 ft. (Opens Sandcreek pool.)

Greenwood County: J. Furukwa 2 Pentland, C N½ SE SW 9-26s-13e. Dry. TD 1,211 ft.

Marion County: Anderson-Prichard Oil Corp. 1 Schroeder, SE SE NE 22-19s-1e. IPP 90 BOPD, Viola 3,224-28 ft. TD 3,392 ft. (New pay at North Lehigh field.)

1 Hett, SW NE SW 3-19s-2e. IPP 43 BOPD, Simpson, 3,039-41 ft. TD 3,130 ft. .Oil discovery.)

Sedgwick County: Beardmore Drilling Co. et al 1 Tyson, NE SE SW 30-28s-1e. IPF 123 BOPD, Mississippian 3,175-86 ft. TD 3,186 ft. (Opens Gladys pool.)

Saline County: Doley Oil Co. 1 Schrader, SW SW NE 7-15s-4w. Dry. TD 3,836 ft.

Rawlins County: Columbian Fuel Corp. 1 Unger, 9-1s-31w. Dry. TD 2,540 ft.

1 Sluko, C SW 18-1s-31w. Dry. TD 2,521 ft.

Rush County: Virginia Drilling Co. 1 Murphy, SE SE SE 12-19s-20w. Dry. TD 4,475 ft.

Russell County: Transit Corp.-Davis-Amerada 1 Mellard, NE NE SW 1-12s-15w. Dry. TD 3,227 ft.

Thomas County: Derby-Van Grisso 1 Nickel, SE SE SE 16-6s-35w. Dry. TD 4,973 ft.

(Continued on page 188)

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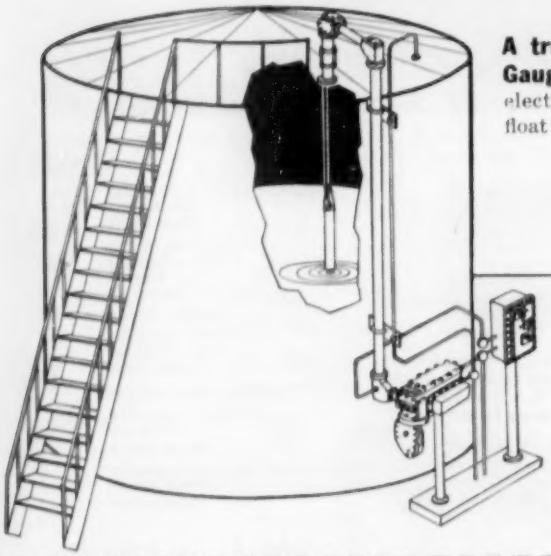

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Veteran Moves Up

New Sohio research head started with firm in 1930

WHEN Standard Oil Co. (Ohio) created the position of research manager, it didn't have to look far to find the right man to fill the post.

Dr. E. C. Hughes, the man selected, had been working in the company's laboratory since 1930, the year he finished college.

Hughes, who will be 50 years old this month, has become a recognized authority in gasoline manufacturing during the years he has spent in Sohio's laboratory. He holds 99 patents on sweetening of gasoline, catalytic reforming, lube-oil additives, and other processes. He has published numerous technical papers on catalytic conversion of hydrocarbons, naphtha reforming, lubricating oils, asphalt, and other subjects.

"Doc," as his friends call him, started with Sohio as head chemist in the chemical and physical research laboratory. In 1944, he became chief of the chemical and research division, the post he held until his promotion last month.

In his new job, Dr. Hughes is in charge of all Sohio chemical and physical research activities except those pertaining to production.

His promtion was part of a general reorganization in the technical divisions of Sohio's manufacturing department. The reorganization is in preparation for the company's anticipated expansion, especially in the petrochemical field.

Hughes at home . . . The father of five children, Hughes has almost as busy a life after work hours as he does in the laboratory. His wife frequently chides him good-naturedly for disappearing from home, without advance notice, to take long hikes with his three sons—Robert, 13; Bruce, 8; and Randolph, 7.

"Doc" and his wife, Ruth, reside at Shaker Heights, Ohio. In addition to their three sons, they have two grown daughters—Mary Alice and Kathleen.

Because of his keen interest in his youngsters, the Sohio research manager is very active in Boy Scout work. Other hobbies include music and gardening.

Early life . . . Everett C. Hughes was born at Wadena, Minn., November 22, 1904.

He received his bachelor's degree in chemistry from Carleton College in 1927, and 3 years later received his Ph.D. from Cornell University. While studying at Cornell he was a teaching assistant and Heckscher research fellow.

Hughes and the former Miss Ruth Scherer were married June 20, 1931.

Technical activities . . . Hughes is new chairman of the division of petroleum chemistry, largest division in the American Chemical Society. He has been active in the society for years.

He is on the advisory committee of two research projects sponsored by the American Petroleum Institute, one on composition and properties of petroleum and the other on petroleum hydrocarbons.

During World War II, Dr. Hughes worked closely with the technical advisory committee of the Petroleum Industry War Council. He also is director of the chemical division in Civilian Defense and a member of the committee on research, National Association of Manufacturers.

John W. Gendron has been appointed manager of the oil purchases and exchange department by Tide Water Associated Oil Co. The department was recently created to coordinate the crude and products requirements of the manufacturing and marketing operations of the company.

Charles E. Curry, general superintendent of transportation operations, has been elected a vice president and director of Sohio Pipe Line Co. Curry joined Sohio in 1944 as an engineer in the St. Louis office. Since then, he has served as division engineer, division superintendent, senior superintendent, and on February 1, 1953, became general superintendent.

Marvin Chandler has been named president of Northern Illinois Gas Co. to succeed **H. P. Sedwick,** who was named vice chairman of the board.

Don Brown has joined Oil Drilling & Exploration, Ltd., an Australian company, as chief geologist. Brown had been serving as a geologist with Wilcox Oil Co. before resigning to join Oil Drilling. Brown was scheduled to leave November 21 for Australia where he will establish a consulting geological service for Oil Drilling.

Louis Baker has joined Kilroy Co. of Texas, Inc., as vice president in charge of drilling and production. Baker, who has been serving as a consultant in Houston, was formerly associated with Glenn McCarthy, Inc., as drilling and production superintendent.

Frank Pool, formerly a reservoir engineer with DeGolyer & MacNaughton, has joined Landa Oil Co., Dallas, as vice president and chief engineer. Pool also had worked for El Paso Natural Gas Co. prior to joining DeGolyer & MacNaughton.

E. T. Heck has been promoted to assistant vice president and manager of production and engineering for Minard Run Oil Co. Before his promotion, Heck was chief of geology and engineering.

Carroll F. Malinowsky, formerly area engineer in West Texas for Tennessee Production Co., has joined Buckles & Hostetler, oil consulting firm at Monahans, Tex., as production foreman. **Robert M. Orr** has joined the firm as petroleum engineer. Orr resigned a similar job with Gulf Oil Corp. at Kermit, Tex.

Jesse D. Duplissey has been promoted by Sun Pipe Line Co. from district foreman in the Jameson district of West Texas to assistant superintendent of the company's crude lines department at Beaumont, Tex. Duplissey succeeds **J. Neill Fuquay,** who recently was named superintendent of Sun Pipe Line's southwest area at Corpus Christi.

PERSONALS

E. E. McClusky has been moved from foreman at Ingleside, Tex., to replace Duplissey in the Jameson post. **Henry W. Roy,** formerly district gager at Liberty, Tex., will replace McClusky at Ingleside.

R. D. Sloan has been named division manager of Carter Oil Co.'s western division. Sloan replaces **George E. Wagoner,** who has been appointed exploration adviser of International Petroleum Co., Ltd., at Coral Gables, Fla. Both changes are effective January 1, 1955. Sloan began his career with Carter in 1934 as a geologist in Tulsa. He moved to Billings, Mont., as division geologist in 1945, and in 1948 he was appointed division exploration manager at Denver.

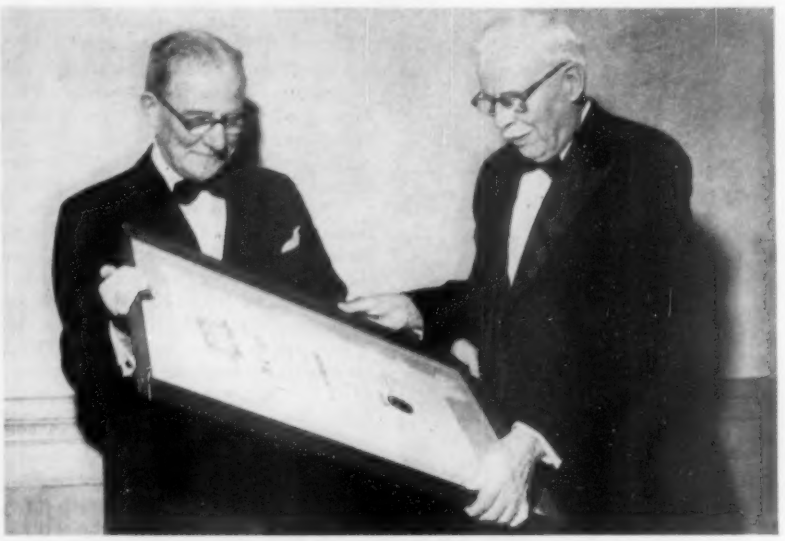
B. E. FRANCIS

Byron E. Francis has been promoted to chief engineer of Northern Natural Gas Co. He succeeds Martin C. Madsen who died September 4. Francis joined Northern in 1939 and was appointed assistant to the vice president in 1942. From August 1952 to June 1953 he was in Washington, D. C., serving as assistant to the director of gas facilities division of Petroleum Administration for Defense.

W. G. Checkley, production geologist with Carter Oil Co., has been transferred from Bowling Green, Ky., to Carmi, Ill. **W. D. Chawner,** who was reported as having been transferred, remains at Bowling Green as district geologist.

W. G. Iverson, former chief geologist for Derby Oil Co., has resigned and opened offices as a consultant and independent producer in Wichita.

Dr. M. King Hubbert, Houston geologist and chief consultant in general geology for Shell Oil Co., has been awarded the Arthur L. Day Medal of Geological Society of America for "distinguished application of chemistry and physics to geology." Dr. Hubbert was chosen Distinguished Lecturer by American Association of Petroleum Geologists in both 1945 and 1952.



Veteran British American Director Honored

Charles L. Suhr (right) a director of British American Oil Co., Ltd., since 1909, was honored by the company recently in Toronto. Suhr, who is chairman of the board of Pennzoil Co. and a director of several other companies, was presented with a certificate and a sterling silver cigar box. A resident of Oil City, Pa., Suhr joined B-A as a director 3 years after its organization as a jobbing concern. His guidance contributed to its growth as an integrated oil company, the largest oil company owned by Canadians.

A. A. Slanis, geologist with Phillips Petroleum Co., has been transferred from Brownfield, Tex., to Evansville, Ind.

D. D. Adams has been named zone manager of exploration by Gulf Oil Corp. for its newly established zone offices in Oklahoma City for the production and exploration departments. Adams, a veteran of 36 years with Gulf, had been serving as area manager of exploration in Oklahoma City. **E. W. Brake** has been named zone superintendent of production for the newly established area. Brake has been with Gulf since 1937. He served as area superintendent at Seminole, Okla. before his promotion. Other changes announced by Gulf are: **Russell E. Hayward,** former area geologist at Oklahoma City, named zone geologist; **H. D. Horton,** area landman in Ardmore, named zone landman; **P. L. Gassett,** former supervisor of drilling operations in Tulsa, named zone drilling supervisor; **F. L. Carpenter,** assistant division petroleum engineer in Tulsa, named zone petroleum engineer; **R. S. Everitt,** former production department personnel coordinator, transferred to Oklahoma City as zone clerk; **William J. Lang,** area geologist at Ardmore, Okla., transferred to Oklahoma City as area manager; **John G. Newell,** assistant area geologist at Oklahoma City, promoted to area geologist; **Elmer L. Herbaly,** assistant area geologist at Ardmore, promoted to area geologist there; and **James H. Welin,** landman at Ardmore, promoted to area landman at Ardmore.

Harlan Scott, division manager for Montana-Dakota Utilities Co., at Great Falls, Mont., has been transferred to division manager at Crookston, Minn.

A. H. Ilfrey, senior petroleum engineer in the Southwest Texas division office of Humble Oil & Refining Co., has been named district petroleum engineer of the Wink district, West Texas division. Other changes are: **W. T. McGarrahan,** roustabout gangpusher at Athens district, East Texas division, promoted to farm boss at Athens; **Woodrow W. Sills,** toolpusher, Greta district, Southwest Texas division, transferred to Snyder district, West Texas division as toolpusher; **J. F. Matthews, Jr.,** civil engineer in Greta district, transferred to Louisiana division office as civil engineer. **J. M. Skipper,** civil engineer in Greta district, transferred to Grand Isle district, Louisiana division as civil engineer; **J. F. McPhail,** civil engineer in Southwest Texas division office, transferred to Louisiana division office as civil engineer; **Edward E. Murray,** senior petroleum engineer, transferred from Conroe district to Gulf Coast division office; and **C. D. Miller, Jr.,** draftsman in Southwest

LAYING THE "B-36"

A GIANT PIPELINE FOR THE GAS INDUSTRY

Transcontinental Gas Pipe Line Corporation's 36" pipe line presented many problems for pipe line constructors to conquer.

The "sewer-pipe" method of construction was adopted. It presented new problems, but also offered many economies.

Extensive grading was necessary to prevent pipe bends in excess of 12 degrees. The 19 miles laid in Alabama required bending 51% of the 40' joints, an average of 69 bends per mile.

From clearing the right-of-way to clean-up, Associated was able to solve the many problems encountered in the construction of the "B-36" gas line.

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PERSONALS

Texas division, transferred to gas-construction division, Houston, and promoted to junior civil engineer.

V. L. Brant has been appointed supervisor in charge of engineering of the research and development department of Mid-Continent Petroleum Corp. **E. C. Mitchell** has been named supervisor of the economics section of the research department.

James E. Leeper has been named manager of its Manderson, Wyo., plant by Jefferson Lake Sulphur Co. The company gets its hydrogen sulfide stream from Socony-Vacuum Oil Co., Inc., nearby natural-gasoline plant.

John W. Henderson has been promoted by Skelly Oil Co. from assistant district geologist to district geologist at Midland, Tex., to fill the vacancy left by the resignation of **Allen Ehlers. Leon S. Ditzell,** formerly staff geologist at Midland, has replaced Henderson.

W. B. GOLUSH

W. B. Golush has been named manager of the gas department by Shell Oil Co. The department was formed recently when Shell decided to reorganize its mechanical engineering department for exploration and production in separate gas, technological, and mechanical engineering departments. Golush had been serving as head office gas representative since 1952. **J. T. Jordan,** formerly chief technologist in New York, has been promoted to manager of the technological department. Jordan's division is presently studying tar sands and in situ combustion. **J. D. Goodrich,** former production manager of North Texas division of the Tulsa area, has been appointed manager of the mechanical engineering department. Goodrich will be responsible for coordination of mechanical engineering work in the company's various production areas.

J. T. JORDAN

J. D. GOODRICH

H. W. Brown has been elected a director of Carter Oil Co. Brown began his career in the oil industry 26 years ago as a seismograph operator. At the time of his advancement to Carter's board of directors, he was serving as manager of the exploration department. **Merrill W. Haas,** chief geologist for Carter, has been promoted to succeed Brown as exploration manager. Haas joined Carter in 1950 after serving for over 15 years with other Standard Oil Co. (N.J.) subsidiaries.

H. W. BROWN

M. W. HAAS

Z. D. Bonner has been promoted to assistant to the director of coordination by Gulf Oil Corp. Before his advancement, Bonner was assistant technical foreman with Gulf at Port Arthur, Tex.

Bobby Bonner, production engineer with Texas Pacific Coal & Oil Co., has been transferred from Fort Worth to Calgary.

D. R. Pflug has been named chief engineer of Trans-Canada Pipe Lines, Ltd. Pflug comes to Trans-Canada from United Gas Pipeline Co., Shreveport, where he was superintendent of operations. Pflug had served with United for 20 years and at one time was with A. O. Smith Corp. Other staff appointments announced by Trans-Canada include: **R. J. (Don) Wallace,** named manager of gas supply; **Douglas G. Simpson,** controller and assistant treasurer; and **D. W. Brown,** information officer.

D. R. PFLUG

DEATHS

Ray E. Miller, 59, adviser to the petroleum chemicals division of the organic department of E. I. du Pont de Nemours & Co., (Inc.), died November 16 in a New York City hospital. Miller was a member of the board of directors of American Petroleum Institute. In 1943-44 he served as president of Natural Gasoline Association of America. In 1934 Miller joined the old Hanlon-Buchanan, Inc., as a vice president, a post he held until becoming a vice president and director of Warren Petroleum Corp. in 1946. He joined du Pont in 1946 as sales director for petroleum additives and later became sales director of the petroleum chemicals division.

Hubert L. Rawlins, Jr., 24, chemical engineer with Shell Oil Co., Houston, was burned to death in an oil-field explosion near New Iberia, La., November 16. Rawlins was working on the electrical control valve on a storage tank at Weeks Island field when the electrical circuit to the valve shorted out and accumulated vapor around the valve exploded.

R. B. (Cyclone) Jackson, 77, oil land developer and widely known evangelist, died recently in Los Angeles. Jackson was active as a developer and operator in Texas, and in Kern County, Bakersfield, Cuyama Valley, and Tejon Hills in California. In addition to his oil interests, Jackson had visited most of the United States, and Canada and Cuba in evangelistic work.

Ellis F. (Earl) Davis, 54, manager of the production department, technical services division, of Shell Oil Co. at Houston, died in Houston recently after an illness of several months. Davis had been with Shell for 31 years and was a pioneer in the development of portable oil drilling equipment. Davis also served with Shell at Tulsa from 1934 to 1947 as production superintendent and general drilling superintendent. He was production manager for Shell in Calgary from 1951 until 1952.

Carl F. Salzer, assistant to the vice president and comptroller of Gulf Oil Corp., died recently in Pittsburgh. Selzer served with Gulf for 29 years.

James V. Schilling, 75, one of the founders of the old Cardinal Oil Co., died recently at his home in San Angelo, Tex.

Dr. Richard H. Patch, 66, vice president in charge of operations and a member of the board of E. F. Houghton & Co., died November 13 in Hot Springs, Ark.

Dependable S&J SWING LINE ASSEMBLY

Fig. ST-235

Swing line equipment for petroleum storage tanks can only be as efficient and dependable in operation as its design and manufacture make it. You can be assured that Shand & Jurs Swing Line assemblies possess that top notch QUALITY that set them head and shoulders above the rest. Consider these features of S&J's Swing Line Assemblies that provide long life operation and greater dependability under all weather and operating conditions:

The S&J Double Elbow Swing Joint, Fig. ST-235, is designed for mounting on the tank shell only. Settling or shifting of the tank bottom cannot affect its free and easy swing. The two elbows are held together by a spring loaded rod and tension can be adjusted. The swivel elbow is supported by a thrust bearing which is tied to the tank shell by telescoping supports that facilitate installation. Telescoping supports are supplied only when specified.

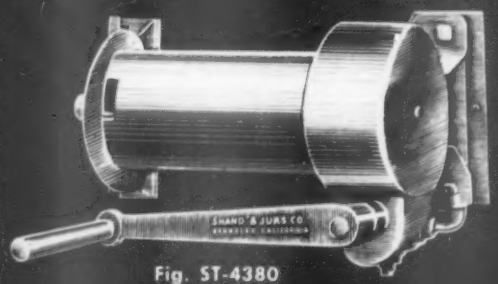

Fig. ST-4380

The S&J Cable Winch, Fig. ST-4380, utilizes machine cut, anti back-lash gears which run in an oil bath. The handle is designed to provide maximum mechanical advantage with minimum effort.

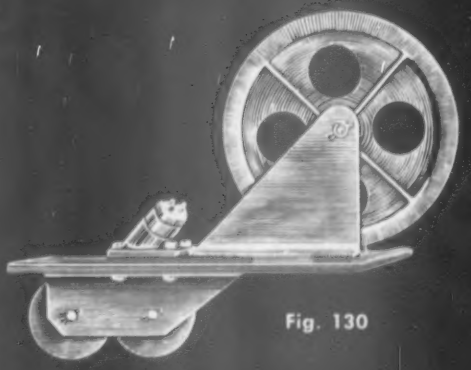

Fig. 130

The design of the S&J Cable Sheave Bracket, Fig. 130, assures proper alignment of the plow steel cable passing through the tank roof and over the exterior sheave. Also available are S&J Gas Tight Cable Sheave Cases which provide an oil seal for moderate tank pressures.

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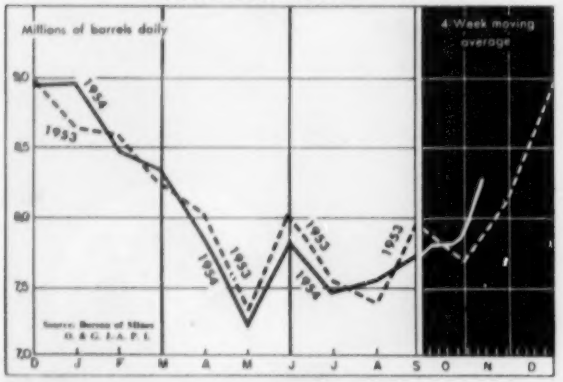
Latest Figures . . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,236,075	UP	11,250	DOWN	37,995
Crude stocks	270,402,000	DOWN	1,783,000	DOWN	13,413,000
Completions	1,033	UP	18	UP	68
Refinery runs	6,883,000	DOWN	58,000	DOWN	68,000
Gasoline stocks	147,896,000	DOWN	1,242,000	UP	5,060,000
Four-product stocks	376,898,000	DOWN	4,085,000	UP	12,100,000
Total imports	1,036,100	DOWN	104,900	DOWN	253,500

TOTAL DEMAND—ALL OILS



Well Completions Will Pass Last Year's Record in Three More Weeks

WELL completions through the week ended November 13 reached the cumulative total of 46,693 for an increase of almost 8.5 per cent over the total for the corresponding period last year.

Even if the drilling rate declines in the coming week, the cumulative total by December 4 will have passed the final total for 1953.

The period between November 13 and the end of the year represents almost 7 weeks. If total completions average 900 wells per week during the period, 6,300 wells will be added to the cumulative total of 46,693 on November 13. This would give a total for the year of almost 53,000 wells compared with 49,279 in 1953 and 45,821 in 1952.

Some operators have been predicting a decrease in drilling in the last quarter, and industry reports to the Journal at midyear indicated that well completions in the last half would be less than in the first half of the year.

However, current trends now point to more wells completed in the last half than in the first. First-half completions reached 25,904, and in the 4½ months since midyear the total has climbed to 20,789 wells. Operators would need to complete only about 730 wells a week for the next 7 weeks to drill as many wells in the last half as in the first.

Reported drilling activity seems to assure a high level of completions at least for most of the remainder of this year. The number of rotary rigs active in the United States, reported by Hughes Tool Co., has increased 193 in the past 2 weeks. The report for November 15 showed more rigs in operation than at any time since the end of May.

More oil wells . . . The higher percentage of development completions this year has been a factor in the better ratio of oil wells to total completions. For the first 9 months of the year, oil-well completions represented about 55.5 per cent of total wells drilled compared with about 52 per cent for the same period in 1953.

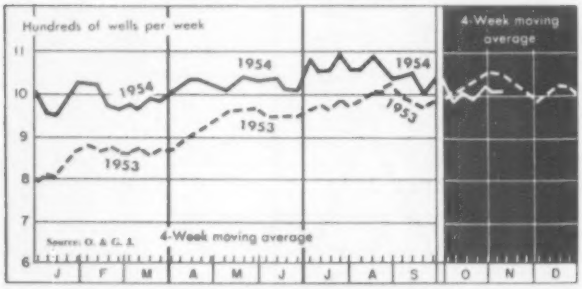
If the ratio of 55.5 per cent continues to the end of the year and if the total for the year reaches 53,000 wells, oil-well completions may reach the amazing total of 29,400 for the year.

If these oil wells represent additions to reserves through extensions or further development of known fields as well as pool discoveries, the year's drilling may raise the ratio of reserves to production.

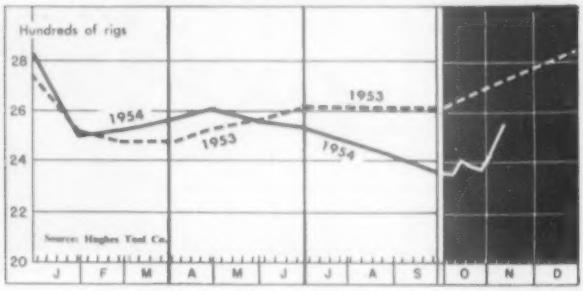
Refined product data . . . Total indicated demand for all products in the week ended November 13 increased about 715,000 bbl. daily over the preceding week. Gasoline was up 250,000 bbl. daily. Kerosine increased 160,000 bbl. daily. Distillate gained 300,000 bbl. daily, and residual moved up about 30,000 bbl. daily. A decrease of 25,000 bbl. daily is estimated for other products.

The increase in refinery output of products in contrast with the decrease in runs points to an abnormal week. Also, major product stocks decreased 4,085,000 bbl. for the week. However, the week's average will give a boost to November demand.

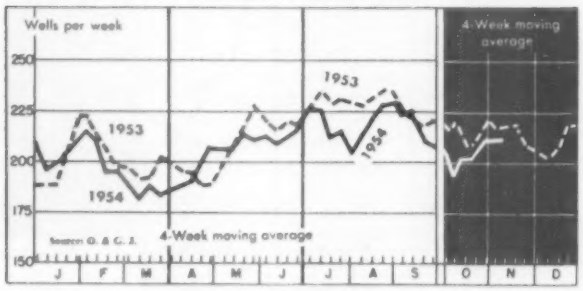
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS

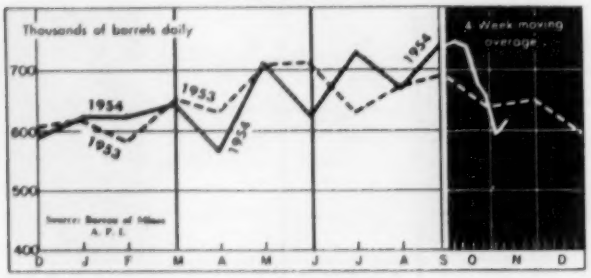
Area	11-15-54	Change from 11-8-54	Change from 11-16-53
Gulf Coast	548	20	— 40
N. and W. Texas-New Mexico	798	63	— 56
Arkansas-N. Louisiana-E. Texas	186	1	— 17
Oklahoma	316	20	— 73
Kansas-S. Nebraska	175	16	15
Illinois-Eastern	148	11	— 10
Rocky Mountain	251	— 4	— 34
Pacific Coast	142	6	— 20
Total United States	2,564	133	—235
Western Canada	195	4	— 36

WEEKLY WELL COMPLETIONS . . . WEEK ENDED NOVEMBER 13, 1954

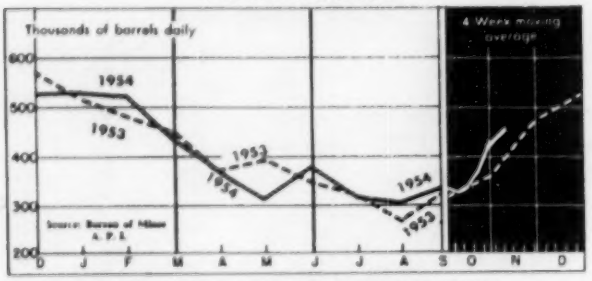
	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1954				
	Comp.	Oil	Gas	Dry	Footage	1954	1953	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	3	0	0	3	15,192	93	122	0	0	0	2	2	2	0	2	80	84
Arkansas	10	5	0	5	44,000	559	498	0	0	0	0	0	21	0	4	102	127
California	33	23	1	9	157,812	2,043	2,234	0	0	0	8	8	51	1	12	453	517
Colorado	31	7	2	22	172,204	1,140	618	2	0	0	18	20	31	0	17	480	528
Illinois	60	29	0	31	151,033	2,678	1,803	2	0	0	11	13	22	0	1	371	394
Indiana	29	11	0	18	48,109	708	1,139	0	0	0	8	8	9	0	1	141	151
Kansas	109	60	7	42	377,839	3,966	4,249	4	0	2	13	19	78	0	24	535	637
Kentucky	34	10	7	17	77,655	1,011	994	1	0	0	8	9	16	0	4	114	134
Louisiana	73	37	12	24	551,726	3,057	2,499	1	1	3	9	14	93	50	37	304	484
North	31	16	2	13	99,278	1,685	1,114	0	0	1	5	6	17	3	14	132	166
South	42	21	10	11	452,448	1,372	1,385	1	1	2	4	8	76	47	23	172	318
Michigan	15	6	1	8	52,153	495	541	0	0	0	6	6	15	0	0	182	197
Mississippi	11	2	0	9	82,638	371	345	0	0	0	7	7	10	1	0	138	149
Montana	6	5	0	1	35,181	296	383	0	0	0	1	1	6	0	2	96	104
Nebraska	12	5	0	7	73,296	382	286	2	0	0	4	6	23	0	3	121	147
New Mexico	18	18	0	0	103,581	938	1,260	1	0	0	0	1	19	1	17	91	128
North Dakota	6	4	0	2	50,866	265	235	0	0	0	2	2	5	0	0	98	103
Ohio	24	3	7	*14	48,156	1,014	968	0	0	0	0	0	3	0	5	14	22
Oklahoma	158	91	7	†60	507,023	7,776	6,576	1	2	2	18	23	116	5	23	577	721
Pennsylvania-New York	32	9	13	‡10	53,795	1,968	1,944	0	0	0	0	0	0	0	7	35	42
Texas	335	220	17	98	1,526,761	16,120	14,998	17	1	2	58	78	682	64	148	3,607	4,501
Southwest (1 & 4)	42	19	2	21	171,627	2,267	2,429	2	0	1	15	18	96	25	39	624	784
Gulf Coast (2 & 3)	53	32	5	16	342,027	2,317	2,205	2	0	0	10	12	71	32	44	579	726
East (5 & 6)	12	7	3	2	62,523	842	707	0	0	1	2	3	17	0	14	243	274
North Central (7-B & 9)	138	87	0	51	433,009	6,113	5,707	9	0	0	26	35	311	4	20	1,465	1,800
West (7-C & 8)	83	73	2	8	497,395	3,737	3,274	4	1	0	5	10	181	1	22	622	826
Panhandle (10)	7	2	5	0	20,180	844	676	0	0	0	0	0	6	2	9	74	91
Utah	3	0	0	3	2,997	77	62	0	0	0	2	2	3	0	1	48	52
West Virginia	11	2	6	3	32,885	532	519	0	0	0	0	0	0	0	31	15	46
Wyoming	15	5	1	9	82,423	1,091	719	1	0	1	6	8	33	0	7	169	209
Miscellaneous (Iowa, Mo., S. D.)	5	0	0	5	7,237	113	67	0	0	0	5	5	3	0	1	35	39
Total United States	**1,033**	552	81	400	4,254,582	46,693	43,059	32	4	10	186	**232**	1,241	122	347	7,806	9,516
Total previous week	1,015	533	91	391	3,882,489			26	3	9	160	198	1,209	118	337	7,620	9,284
Total November 14, 1953	967	541	52	374	3,672,572			20	3	6	169	198	1,254	94	319	8,022	9,689

Service wells included: *2, †4, ‡7

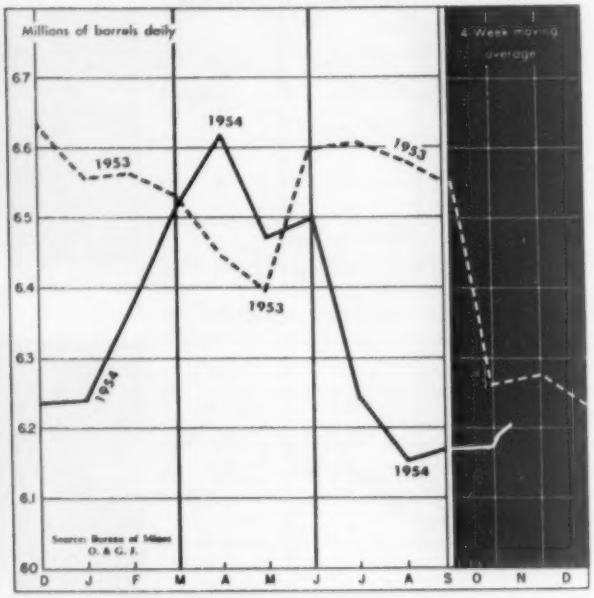
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE-OIL PRODUCTION

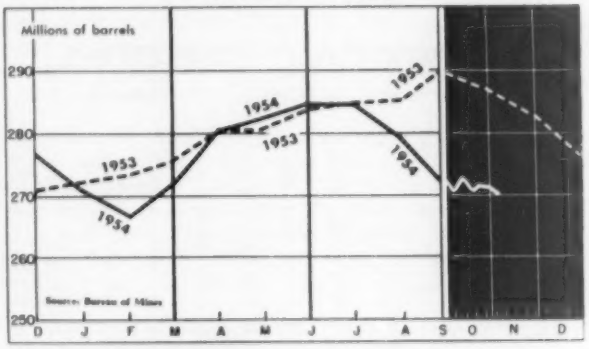


DAILY AVERAGE PRODUCTION FOR WEEK

	November 13			Nov. 6
	Crude oil	Lease condensate	Total	total
Alabama	3,900		3,900	4,000
Arkansas	71,350	500	71,850	72,250
California	960,100		960,100	960,900
Colorado	138,800		138,800	136,700
Eastern	49,500		49,500	49,800
Florida	1,500		1,500	1,500
Illinois	186,700		186,700	186,800
Indiana	28,500		28,500	28,600
Kansas	317,700		317,700	316,400
Kentucky	38,000		38,000	37,900
Louisiana	588,100	43,700	631,800	629,825
North	102,100	2,700	104,800	104,550
South	486,000	41,000	527,000	525,275
Michigan	31,800		31,800	32,700
Mississippi	88,850	3,900	92,750	93,375
Montana	44,100		44,100	43,200
Nebraska	19,500		19,500	19,300
New Mexico	208,600	2,500	211,100	210,100
North Dakota	18,800		18,800	17,300
Oklahoma	480,600		480,600	489,400
Texas	2,598,300	50,375	2,648,675	2,634,875
Dist. 1	43,000	450	43,450	43,275
Dist. 2	133,000	7,700	140,700	139,700
Dist. 3	408,800	23,750	432,550	429,700
Dist. 4	228,000	5,650	233,650	233,075
Dist. 5	43,000	475	43,475	43,325
Dist. 6	109,700	5,025	114,725	113,950
East Texas field	210,500		210,500	208,600
Dist. 7-B	129,000	25	129,025	130,450
Dist. 7-C	172,000	4,600	176,600	176,325
Dist. 8	848,000	2,025	850,025	842,025
Dist. 9	189,300	625	189,925	189,550
Dist. 10	84,000	50	84,050	84,900
Utah	4,700		4,700	5,000
Wyoming	255,400		255,400	254,600
Others	‡300		‡300	‡300
Total U. S.	6,135,100	100,975	**6,236,075**	6,224,825
Change from previous week, up			**11,250**	
Canada	†250,600		†250,600	278,450
Total U. S. production January 1-November 13			2,006,355,950 bbl.	
Same period last year (crude plus cond.)			*2,059,566,659 bbl.	

*Includes 28,729,150 bbl. condensate. †Week ended previous Monday. ‡S.D. 100, Nev. 200.

CRUDE-OIL STOCKS



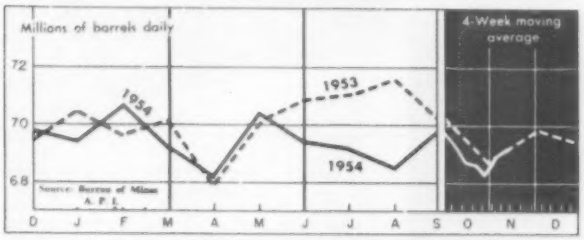
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

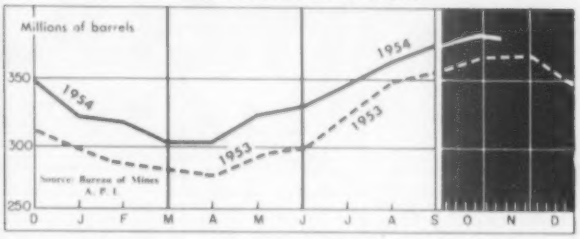
	Nov. 6, '54	Oct. 30, '54	Nov. 7, '53
Pennsylvania Grade	3,237	3,210	2,826
Other Appalachian	2,028	1,949	1,739
Illinois, Indiana, Michigan	12,263	12,421	13,067
Nebraska, N. Dakota	1,820	1,971	(‡)
Kansas	8,703	8,556	9,352
Oklahoma	26,824	26,758	30,284
Arkansas	3,003	3,048	3,119
Louisiana	14,359	15,185	16,668
North	2,337	2,500	2,937
Gulf	12,022	12,685	13,731
Mississippi	3,004	3,005	3,586
New Mexico	8,699	8,526	8,972
Texas	124,809	126,259	134,093
East Texas proper	11,186	10,416	12,026
West Texas	56,427	56,617	59,846
Texas Gulf	24,587	24,741	28,905
Other Texas	32,609	34,485	33,316
Wyoming	12,889	13,092	13,890
Other Rocky Mountain	5,921	5,705	2,926
California	32,066	32,288	32,788
Foreign	†10,777	10,212	10,505
Total	270,402	272,185	283,815

*Bureau of Mines. †Includes 2,943,000 bbl. in California. ‡Included with Kansas.

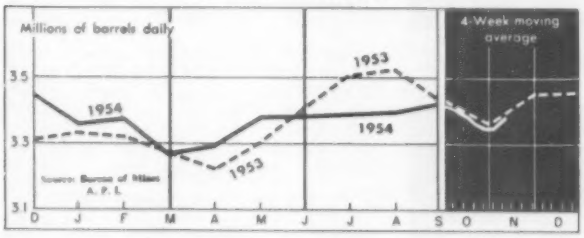
REFINERY RUNS



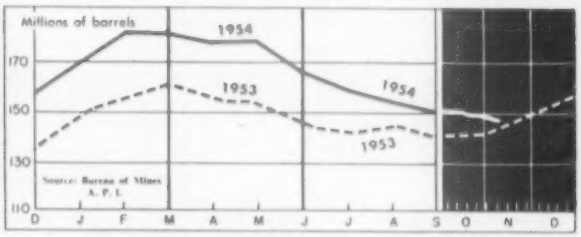
FOUR-PRODUCT STOCKS



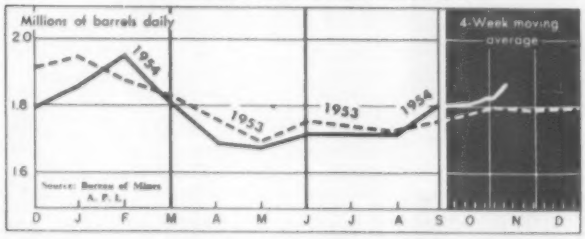
GASOLINE PRODUCTION



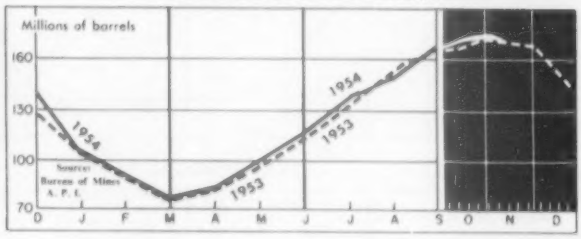
GASOLINE STOCKS



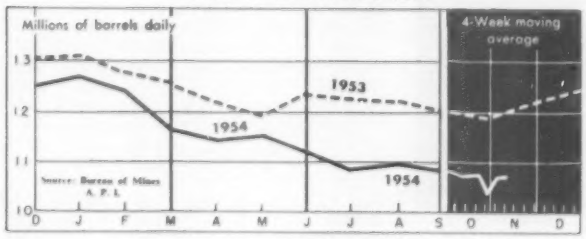
MIDDLE-DISTILLATE PRODUCTION



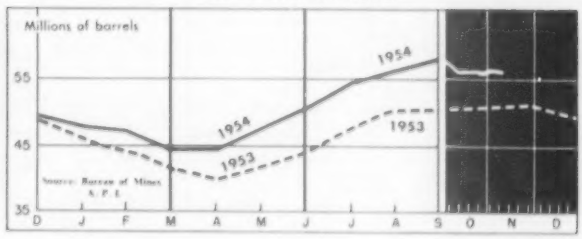
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, NOVEMBER 12

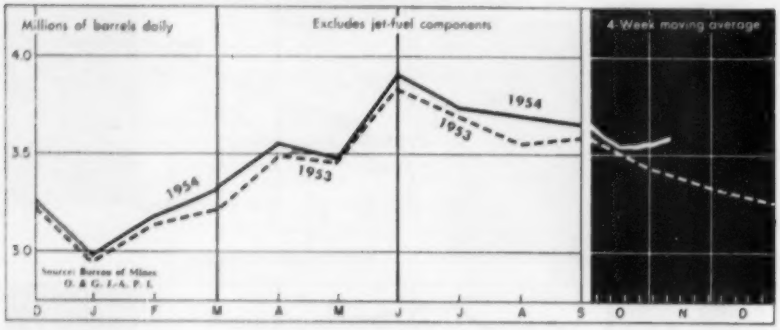
(Excludes all jet-fuel components)

(Thousands of barrels)

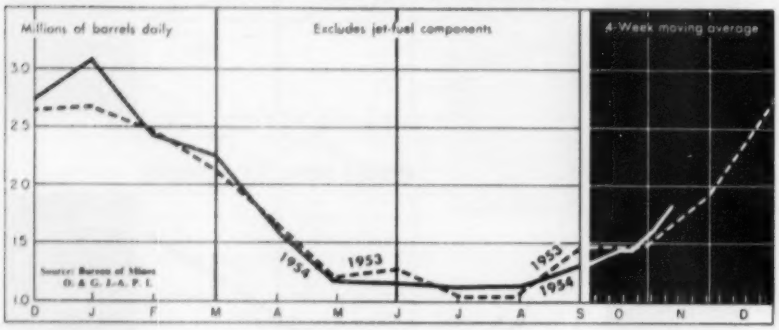
District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks† Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, November 1953 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	966	446.9	28.9	281.7	190.1	34,297	14,646	52,132	10,635	1,028	436.8	34.4	247.0	217.2
Appalachian:														
District 1	85	43.4	4.9	20.4	0.3	4,309	749	2,766	555	115	51.7	6.5	24.6	12.5
District 2	70	28.7	4.4	12.3	10.4	2,296	473	783	302	88	45.2	5.7	14.5	11.9
Ind., Ill., Ky.	1,272	683.0	83.8	266.6	176.8	31,470	9,575	25,604	4,245	1,336	738.4	79.9	249.5	195.2
Okla., Kans., Mo.	2,582	343.4	11.6	143.7	44.3	12,927	2,339	12,955	1,364	592	351.3	17.0	133.1	50.3
Inland Texas	217	187.0	10.6	38.6	24.4	5,653	335	2,244	1,335	230	177.7	8.5	42.7	30.9
Texas Gulf Coast	1,709	813.4	101.0	442.1	218.9	19,956	4,327	17,444	5,443	1,692	826.4	123.0	402.2	243.8
La. Gulf Coast	595	314.6	52.1	178.0	42.4	9,472	2,988	4,909	1,297	552	282.8	60.9	124.7	47.0
N. La. and Ark.	91	35.6	7.9	21.7	6.6	3,990	802	1,561	144	88	37.7	8.5	20.1	7.2
Rocky Mountain:														
New Mexico	20	10.9		4.0	2.9	203		83	32	20	12.5	0.4	3.0	3.6
Other Rocky Mt.	219	97.6	3.3	49.9	33.7	4,970	232	2,202	690	219	112.5	4.8	48.9	38.1
California	1,057	447.1	5.4	170.9	370.6	18,353	309	13,476	30,026	1,027	455.9	4.5	153.1	365.1
November 12, 1954	6,883	3,451.6	313.9	1,629.9	1,121.4	147,896	36,775	136,159	56,068	6,987	3,528.9	354.1	1,463.4	1,222.8
November 5, 1954	6,941	3,295.6	342.1	1,475.7	1,119.9	149,138	38,178	137,138	56,469					
November 14, 1953	6,951	3,420.7	317.1	1,422.1	1,179.7	142,836	36,236	134,532	51,194					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.

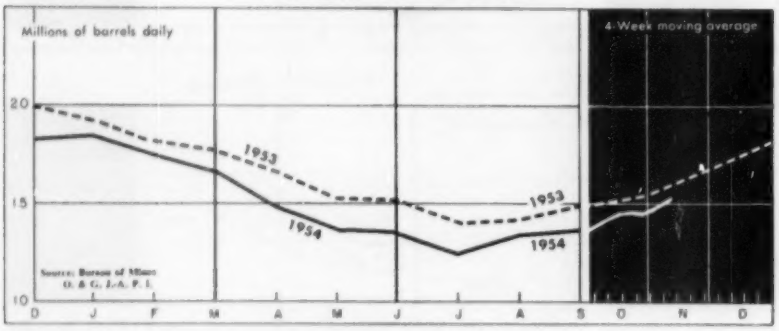
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of November 17, 1954. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.25-11	11.25-12	10.50-10.75
Premium gasoline	11.25-12	13-13.75	11.50-11.75
42-44 w.w. kerosine	9.125-9.25	10.10	9-9.25
No. 2 straw fuel oil	8.375-8.5	9.35	8.5
No. 6 residual	$1.35-1.40	$2.25-2.35	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5.5	5.0	5.25
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX
Mid-Continent

132-134 A.M.P.	6.0

• Gasoline sales are remaining high in most market areas. With some reduction in gasoline yields, the increase in demand over last year has prevented further softening of the gasoline market. Prices are unchanged from last week.

PRODUCTION AND DEMAND—MAJOR PRODUCTS
(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 11-12-54	3,378	3,599
August 1954	3,391	3,649
October 1953	3,359	3,423
November 1953	3,444	3,330
Middle distillate:		
Four weeks ended 11-12-54	1,873	1,865
August 1954	1,755	1,173
October 1953	1,795	1,479
November 1953	1,785	1,926
Four weeks ended 11-12-54	1,086	1,525
August 1954	1,069	1,272
October 1953	1,184	1,521
November 1953	1,223	1,654

CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Effective dates: California, February 16, 1953; east of California, June 15, 1953; Pennsylvania Grade, September 1, 1954.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.23
Middle District	3.15
Southwest Pennsylvania	2.81
West Virginia	2.70
Ohio	2.64
Illinois Basin	2.90-2.95-3.02

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36L SERIAL #16495 with Buda gasoline engine now drilling well near Chicago. Price $8,000. Box H-520, The Oil and Gas Journal, Tulsa, Oklahoma.

1—MODEL RL 3-Drum Cardwell Powered with Buda Model 844D Diesel Engine. Rig and Engine in Perfect Condition. 1-87' 2-Pole Mast. Box H-404, The Oil and Gas Journal, Tulsa, Oklahoma.

5—C96 CONTINENTAL Engines, complete, and 1—Fairbanks-Morse ZC-346 Engine, complete. These engines purchased new in 1952, and are reconditioned and guaranteed. Priced to sell. Price on request. H. & H. Supply Co., Box 4173, Oklahoma City, Oklahoma.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units, Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Adequate storage tanks for all products. Drum Lead Blending Plant. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

USED EQUIPMENT

Franks model 2000 Core Drill double drum drawworks; 98 ft. derrick; 5 x 8 pump; table, swivel, kelly, elevator, elevator links; mounted on 1946 International truck.

Franks SAL 4500 Skid Rotary Rig Cummins Power, 96' Derrick. Located, Tulsa, Oklahoma.

O.C.S. Type 1 Servicing Unit mounted on 1942 Mack Truck. Located Odessa, Texas.

Write, Wire or Call

FRANKS MFG. CORPORATION
BOX 3218, WHITTIER STATION
TULSA, OKLAHOMA

FOR SALE EQUIPMENT

FOR SALE: Sullivan 200 complete with all tools ready to work. Located Tulsa, Okla. Contact R. F. Mesker, Phone 6-0057 or 5-9357 Tulsa.

FOR SALE: 564 ft. of 10" casing, in A-1 condition. Price $1500.00. Contact Duke & Wood Drilling Co., Great Bend, Kansas.

FOR SALE: ENGINE—165 Hp. Climax Model R61, maximum continuous Hp rating 126. Herndon Drilling Company, 421 Mayo Building, Tulsa, Phone 4-9700.

FOR SALE—Near Gladewater, dismantled 1 National G-100 geared pumping power complete with 100 HP. Superior Type BT Twin Cylinder 2 Cyl. gas engine and companion material, $1500.00. Contact O. C. Brown, Gladewater office, or Patridge, Cities Service Oil Company, Bartlesville.

FOR SALE
WILSON MOGUL 42 ROADARE

Fully equipped with 5000' Grade D & E Drill Pipe, Seven 6¼" Drill Collars, 96' Heavy Duty Mast, F X Z 7¼" x 12" Gardner-Denver Pump, Two WAKDU Waukesha Motors and Miscellaneous Equipment to make complete Drilling Rig. Purchased February 1st, 1953, and Drilled 166,124' of Hole. 1000' above Drill Pipe used on one well. Equipped to Drill 5000'. For Details Contact:

NORTHERN PUMP COMPANY
Chas. J. Beu, Box 94, Telephone 7817, Great Bend, Kansas

or—**NORTHERN PUMP COMPANY**
Telephone SUNSET 8-8601, Minneapolis, Minnesota

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Columns: 8' x 28', 7' 6" x 56', 7' 4" x 70', 7' x 5' x 70', (2) 7' x 57' (400#), 7' x 42', 6' x 63', 5' x 62', 4' x 72', 4' x 47', (250#), 3' 6" x 63', 2' 6" x 60', 2' x 75', 2' x 45' (250#).

Heat Exchangers:

(5) 1,660 sq. ft. (Adm.), (2) 1,125 sq. ft. (850 lb.), 1000 sq. ft., 600 sq. ft. (Adm.), (5) 424 sq. ft. (Adm.), (5) 360 sq. ft., (4) 260 sq. ft.

60—Turbine driven centrifugal pumps, SS & Steel, 1" x 1" to 8" x 8".

2—6-stage Pacific pumps 730 GPM. 2,000 ft. hd.

2—Clark MA-4 150 BHP engines.

4 IR XVG-8 engines.

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Oliver Filters: 8' x 10', 5' 3" x 8'.

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SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: Three type 80 Cooper Gas Engine Compressors completely rebuilt. Two type 80 Cooper Compressors as is. One 100 H.P. Superior as is or rebuilt. One Clark 100 H.P. Gas Engine driven Compressor. W. S. Smith, 205 Thompson Bldg., Tulsa, Okla.

CORE DRILLS—Acker Model for 150' coring $1855. Acker Model for 350' coring $2715. Acker Model for 800' coring $5410. Everything for well drilling. S. W. Pressey & Son., Pueblo, Colo.

ELLIOTT Centrifugal Blower, 14,000 cfm, size 48-A, Type "O," single stage, 2.25 psi, 125 hp Motor. Excellent condition. Refinery Materials Co., Box 14306, Houston.

FOR SALE: 5500 ft. Trailer Rig with 7¼" x 14" Gardner-Denver pump, 5" x 10" Gardner-Denver Pump, 5000' of 3½" Drill Pipe, Light Plants, Bunk House and all other necessary equipment to make up complete drilling rig. Perfect Condition. For inventory and price write to Box H-504, The Oil and Gas Journal, Tulsa, Oklahoma.

COMPLETE RIG: New U-15 Drawworks with four 250 Horse Power Cummins diesel engines through hydraulic couplings, hydromatic brakes on 127-foot 450,000-lb. Lee C. Moore mast and substructure, 8,000 Ft. 4½" Drill Pipe, 14 new 7" O.D. x 2¼" Bore Drill Collars, new Emsco D-500 7½" x 16" pump, new Cameron twin hydraulic BOP, and all accessories. Good condition. Now drilling 8,000-ft. well in Rocky Mountain area. Inventory on request. Box H-403, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE

53 Million Cubic Feet Capacity
Dehydration Unit
(NEW AS SHIPPED FROM FACTORY)

One complete BS&B Glycol Dehydration Unit—Regenerative equipment is skid-mounted and the two contractors are externally piped, requiring minimum labor for field erection. Dew point depression of 65° guaranteed by BS&B when handling 53 MMCF per day or less when inlet gas saturated with water vapor at 80° F. and 800 lb. psig. Maximum working pressure 1000 lbs. psig. Glycol carry-over loss guaranteed by BS&B not to exceed 0.1 gallons per million feet when operated at capacity.

Price 80% of cost,
f.o.b. Woodlawn, Texas

Woodlawn Processing Corporation
P. O. Box 4128, Centenary Station
Shreveport, Louisiana

FOR SALE EQUIPMENT

U-15 WITH hydromatic brakes, powered by four 250 Horse Power Cummins diesel engines through hydraulic couplings with 127' Lee C. Moore mast, 4½" drill pipe, 6¼" drill collars. Oilwell 14P pump, mechanical Shaffer double BOP and all accessories for complete rig. First class operating condition. Rocky Mountains. Inventory on request. Box H-405, The Oil and Gas Journal, Tulsa, Oklahoma.

LIKE NEW—Model FL-704 Double Drum Cardwell Spudder, complete with 145-GK Waukesha, 55-foot double leg mast, complete 5- and 7-inch tools, tubing and rod tools. Rig only 15 months old and in excellent condition. A real buy at a bargain price. Located Russell, Kansas. Contact C. Spitzfaden—LD-128 or 62-6037, Wichita, Kansas.

GAS METERS. Westcott and Foxboro orifice meters and controllers. Bristol recording pressure gauges. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

FOR SALE: 3600' 4½" extra hole drill pipe, good for shallow drilling. $.90 per foot. Terms. Melton Supply Company, Box 1360, Seminole, Okla.

2500 FT. FAILING rotary rig available for contract work. Production, slim hole, or cleanout. Rig and drill pipe A-1. Contact M & G Drilling Co., 1102 East St., Iola, Kansas. Phone 1979.

EQUIPMENT WANTED

CASH FOR 28 or 36L Erie-Bucyrus with tools in good condition. Phone 72-4533 or P. O. Box 26, Tulsa.

WANTED—good used 4½", 20#, drill pipe. Give location, quantity and price—Sharp Drilling Company, Box 1271, Midland, Texas.

WE PAY THE MOST for Used Line pipe, used casing, abandoned leases, Gore Oil Field Supplies. Box 1063, Tulsa, Okla.

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED

Drawworks, engines and compound capable of drilling 10,000 to 12,000 feet. Give price, description and present location in your reply.

BOX 1845, OKLAHOMA CITY, OKLA.

WANTED
Engines and Compressors

Used Cooper-Bessemer JS 8, LS or LSV units, 1,000 H.P. or over.

Used Cooper-Bessemer GMV 10, GMW or M-Line Compressors.

Box H-480, The Oil and Gas Journal, Tulsa, Oklahoma

GIFTS

EXCLUSIVE hand embroidered OIL DERRICK Neckties in attractive poplin—green, blue, yellow, maroon, brown, red. $2.75 each; $15.00 in lots of six—Cash, check or money order. Allow 15 days for delivery. Eleson Fabric Shop, 875 Broadway, Bowling Green, Ky.

SOIL ANALYSIS

AT LAST, the secret of soil analysis in hunting for oil may be yours. Free details. Surfac Oil Surveys, 1414 Electric Bldg., Fort Worth, Texas.

REAL ESTATE

FOR SALE: Kiowa Oil Company Yard, approximately three acres at Great Bend, Kansas, consisting of: 1 Quonset Building, 100' long, 40' wide, 20'3" high; 2 room office in one end of building, all cement floor, modern. 1 one story duplex building, 4 rooms on each side with bath. 1 Tool shed, 16x30. 1 Tool Building 28x30. 10 Welded Casing Racks made out of 4" drill pipe. 1 Truck Garage, 31x61. Yard is enclosed with 8' Wire Mesh Fence. Contact Kiowa Oil Company, 717 Union National Bank Bldg., Wichita 2, Kansas; phone FO 3-8013.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

WANTED: By an independent oil company, a graduate Petroleum Engineer with varied experience in secondary recovery operations in the Tri-State area. Please give full particulars of experience and salary expected in the first reply. Box H-510, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR A BETTER-PAID JOB

Production and Reservoir Engineers, Geologists, Draftsmen; Geophysicists, Party Chiefs, Computers and Field Crew Staff. WRITE US—STRICTEST CONFIDENCE.

GOOD EMPLOYMENT AGENCY
1554 California, Denver. AC 0035

Young lady, economic major, with stenographic skill, to work as statistical research assistant in petroleum department of large New York organization. Write giving personal data, salary desired, to:

Department 24-C
Post Office Box 226,
Church Street Station,
New York 8, N. Y.

GEOLOGIST

A large oil company requires a Senior Geologist having six to ten years' experience. Roving assignments world-wide doing reconnaissance work as a party chief.

Attractive salary, liberal annuity and savings programs offered.

Write giving age, marital status, education, and experience in detail.

BOX 308-C
RADIO CITY STATION,
NEW YORK 19, NEW YORK

HELP WANTED

INDEPENDENT Oil Company wants man with finance background for sales and contact work in field of Oil Exploration. Salary in line with ability and commission. Box H-512, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERINTENDENT—35 to 55 years of age, for Asphalt Division of large independent Mid-Western refiner. Minimum of ten years asphalt experience required. Good salary and fine opportunity for advancement for right man. Box H-492, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER

Major Oil Company in Venezuela has opening for graduate engineer (P.E. or Ch.E) with minimum 3 yrs. oil field exp., preferably in production engineering.

Extensive experience in chemical phases of production such as corrosion and scale control, salt water disposal by reinjection desired.

Write giving full details to:

P. O. Box 2235, Bowling Green Station
New York 4, New York

PETROLEUM ENGINEERS

Experienced graduate engineers or recent graduates, for immediate and future job openings in Saudi Arabia and New York City. For engineering work in development, production, drilling, process, and oil and gas engineering on primary and secondary recovery problems.

Salaries commensurate with education and experience. Write giving full particulars regarding personal history and work experience. Please include telephone number.

Recruiting Supervisor, Box 79
ARABIAN AMERICAN OIL CO.
505 Park Avenue, New York 22, N. Y.

BRAZIL
PETROLEUM REFINERY
SANTOS, BRAZIL

YIELDS & COST CLERK—thoroughly experienced all phases calculating charges and yields, including forecasting, of petroleum refinery units at refinery site.

ASSISTANT MAINTENANCE SUPERVISOR—thoroughly experienced all phases refinery operation, maintenance and turnaround.

Above personnel will assist in operating, & train & instruct Brazilian personnel in operations of a new 45,000 BPD petroleum refinery producing gasoline, diesel & heavy fuels by thermal cracking & catalytic polymerization.

Challenging opportunity for 18 to 24 months foreign employment. Excellent base salary plus living allowance & production bonus, & exemption from income tax for continuous 17 months foreign residence. Wives & minor dependent children may join personnel in Brazil at our expense.

Interviews arranged at our expense on basis of confidential complete chronological resume, including education & employment (names & addresses of employers, dates employed, positions held & scope of responsibility, salaries received, location & type of jobs, etc.). Airmail data to

PERSONNEL DEPARTMENT
HYDROCARBON RESEARCH, INC.
115 BROADWAY NEW YORK 6, N. Y.

HELP WANTED

GAS ENGINEER—Under 30—Engineering Degree with oil or gas experience. Permanent employment with large gas company. Beginning salary under $500. Box H-509, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL OR MECHANICAL Engineer, under 35, for responsible position in Alabama Asphalt Refinery. Process or maintenance experience desired. This is good opportunity with established independent. Box H-491, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$6,000 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates. 434 Frick Bldg., Pittsburgh 19, Pa.

SITUATIONS WANTED

GEOLOGIST—Five years in Rocky Mountains. Two with major company. Available soon. Excellent references. Box H-517, The Oil and Gas Journal, Tulsa, Oklahoma.

LLB DEGREE, age 29, 3½ years experience in lease-title and rental section of Major Oil Company, desires position as landman. Willing to relocate. Box H-518, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING & PRODUCTION Supt., available, 20 yrs. experience Oil & Gas, 43 yrs. of age, married, sober, best of reference. Box H-505, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED REFINERY ENGINEER, completing Masters Degree in production engineering. Speak Persian and English. Single, 24. Will relocate. Box H-514, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—34. Qualified as district manager for independent. Experience in Texas, Colorado, and Wyoming gave a uniform balance of academic, practical, and economic knowledge of finding oil. Currently engaged in subsurface research. Box H-515, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED PETROLEUM ENGINEER, M.S. with seven years varied experience in oil production. Past three years in operating and evaluating water flood properties. Desire responsible position with aggressive independent or individual. Box H-516, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 29; Single; B.S. plus graduate studies; 18 months well site geologist, 18 months in geophysics. Desire position in exploration geology—domestic or foreign. Box H-506, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST—10 years experience Texas, Louisiana, Oklahoma, Kansas, Nebraska, in well supervision, evaluation, appraisal, reports, record checking. Desires connection with progressive individual or small company. Will locate anywhere domestic. Box H-494, The Oil and Gas Journal, Tulsa, Oklahoma.

CONSTRUCTION SUPERINTENDENT: twenty years experience, Industrial plants. Sewer treatment plants, pumping stations all types. M.E. Degree. Qualified to take full responsibility of projects. Cost conscious, know men and equipment, will consider Foreign work, with Major engineer-constructors. Available immediately. Box H-495, The Oil and Gas Journal, Tulsa, Oklahoma.

Well organized, well established oilwell drilling contractor desires the management and supervision of oil properties in West Texas, Central Texas, and New Mexico. Can provide complete handling of oil properties, from acquisition to production. No properties too small, and none too large to handle. Inquiries from independents, groups, small or medium sized oil companies invited.

Write, wire, or call collect for further information.

MAHIN DRILLING COMPANY

P. O. Box 1628, Hobbs, New Mexico.
Phone 3-3141.

146 Allen Building, Midland, Texas.
Phone 2-2962.

LEASE AND DRILLING BLOCKS

1120 ACRES for Oil and Gas development, located near Oxford, Kansas, less than one mile of settled production. Box 654, Winfield, Kansas, phone 60.

HAVE SEVERAL large drilling blocks, either for sale or to be drilled. Nothing under 10,000 acres. Two of these blocks are in the hottest county in New Mexico. Tomahawk Oil & Drilling Company, 112 8th St., N.W., Albuquerque, N. M.

QUICK CASH for producing Royalties, production, or over-rides. Consider drilling blocks. Robert L. Kinkaid, P. O. Box 26, Tulsa.

SEE A. L. BOWLES, Box 947, Ada, Okla., for drilling deals and producing royalties if you have the cash for Oil Investments.

Will pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis, Mo.

OIL PRODUCTION

We have several producing oil properties for sale in Texas. Shallow depths. Will deal only with principals.

Box H-496, The Oil and Gas Journal, Tulsa, Oklahoma

BUSINESS SERVICE

Delaware Corporations formed and serviced, American Guaranty & Trust Company, P. O. Box 487, Wilmington, Delaware.

ROYALTIES

WISH TO BUY producing royalties. Box H-379, The Oil and Gas Journal, Tulsa, Oklahoma.

JACK EAGLE, Oil Properties, 706 City Nat'l. Bldg., Oklahoma City, Oklahoma. Telephone REgent 6-7027.

OFFERING CHOICE PRODUCING oil income royalties with large reserves per Dollar investments. A. S. Berry, 817 Wright Bldg., Tulsa, Okla.

STRIP LOG CABINETS

MORE LOGS ARE FILED in Kraftbilt Strip Log Cabinets than all others combined! Loaded drawers glide smoothly on roller bearings. Three drawers to section—add sections as needed. Built to last a lifetime! Send for Catalog 352-B. Ross-Martin Co. P. O. Box 800-A, Tulsa 1, Okla.

WANTED

LEADING OIL equipment-manufacturer wants ideas and new or improved equipment for Refining, Pipeline, Producing or Marketing Divisions. Will acquire small or medium size companies. Our Research Department, manufacturing facilities, capital, management and nationwide sales force are well established and will buy or develop patents or work on royalty or profit sharing basis. Box H-488, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITY

FOR SALE—Producing override in Oklahoma. Priced to sell. Owner needs some cash. Good place to invest income tax money. Box H-519, The Oil and Gas Journal, Tulsa, Oklahoma.

ADDITIONAL LINE wanted by small established firm, with history of steady healthy growth; experienced staff, warehouse facilities. Serves Southern California petroleum industry, including majors; drilling, production and refining divisions. Box H-513, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITY

$4,000,000,000

RAW MATERIAL (PIGMENT) DEPOSIT

Sell or Lease

PROMOTERS FINANCIAL MEN CORPORATION

This pigment deposit offers a golden opportunity to put your excess capital to work, form your own corporation to take over this deposit, above dollar figure is not for purpose of negotiating, it represents wholesale net profit if processed and sold for certain use. Pigment is a high grade natural industrial filler, deposit particle size, fine enough for most use with out process, use—practically all industrial fields and products in which a filler is a part, field, unlimited, ready market available. Qualified, Investigate now. Write

C. G. Nitz, 212 N. 64th St., Milwaukee 13, Wisconsin

LEGAL NOTICE

LEGAL NOTICE

NOTICE OF SALE OF INTEREST IN PRODUCING OIL AND GAS PROPERTY

Notice is hereby given that the undersigned, Wm. B. Prugh and J. D. Land, Trustees of SECOND LARKINS-WARR TRUST, an Express Trust organized under the laws of the State of Oklahoma, will offer for sale and sell to the highest bidder for cash the interest of said Second Larkins-Warr Trust, an Express Trust, in four producing oil leases located in the Oklahoma City field, which sale will be effective on the 4th day of January, 1955.

The property to be sold consists of the one-third of seven-eighths working interest of Second Larkins-Warr Trust, an Express Trust, in the Carney, Goodwin, Katy B-4 and Travis leases, on each of which is one producing oil well.

The undersigned trustees will receive written, sealed bids for the interest of said trust as above described in the office of the trust, 907 Kennedy Building, Tulsa 3, Oklahoma. The bids will be opened on the 15th day of December, 1954, at 10 o'clock A.M. The trustees, however, reserve the absolute right to reject any and all bids.

Information concerning said leases, together with engineering reports, are available to prospective bidders in the office of the trust where they may be examined but not removed.

The interests in the above leases are being sold in accordance with Article VI of the Trust Indenture, dated January 4, 1935, under which said trust was created. Said Article VI provides that the trust shall terminate at the expiration of a twenty year period, and the trustees shall then proceed to liquidate and wind up the affairs of the trust. The trust indenture is available for inspection in the office of the trust where it may be examined but not removed.

DATED at Tulsa, Oklahoma, this 13th day of November, 1954.

SIGNED: Wm. B. Prugh, J. D. Land, "Trustees."

Equipment Men

Vapor Recovery Names Denny As Vice President

George E. Denny has been appointed vice president and general manager of Vapor Recovery Systems Co., as announced by Frank V. Long, Sr., company president. Denny has been associated with Vapor Recovery for 10 years in the capacity of chief draftsman, production engineer, chief engineer, and general manager. He succeeds L. S. Curfew, who has resigned from the vice presidency after 27 years of service.

G. E. DENNY

W. G. HEIN

W. G. Hein has become assistant general manager as well as chief engineer. Hein has been with the firm for 3 years. His previous associations were with Western Precipitation Corp., a Los Angeles firm, and Combustion Engineering, Inc., of New York.

Ray V. Long has been transferred to factory sales. He has been working in the various departments of Vapor Recovery in preparation for his present position.

Harold L. Curfew is now manager of production control. He has been associated with the company for the past 6 years in the manufacturing, costs, and sales departments.

Smithco Purchases Drake Co. Property At Tulsa

Orville Smith, president of Smithco Engineering, has just announced that the firm has purchased all the facilities and rights of Drake Co.

The acquisition of the 17-year-old Drake Co. has provided Smithco with necessary machine tools, plant facilities, and trained personnel to adequately meet its expanding sales volume.

For more than 5 years after his graduation from the University of Oklahoma, Smith was with General Electric Co. working on the design of motors and controls. For the past 8 years he has been associated with the petroleum industry in the sale and design of air-cooled heat exchangers.

Clark Bros. Appoints Two New Vice Presidents

The appointment of F. H. Hayes and and A. K. Hegeman to vice presidents has been announced by Clark Bros. Co., Olean, N. Y.

Hayes, manager of the Clark Houston district sales office, has been selling Clark compressors for over two decades. Prior to his association with Clark, he had been active in the mining and pipeline pumping-equipment field. He joined Clark in 1935 at the time the Houston office was opened and has been district manager of the territory ever since.

Hegeman first started selling Clark compressors on the West Coast over 30 years ago when he became associated with Smith, Booth & Usher Co. handling the sales and servicing of Clark equipment. When Clark opened its West Coast office in 1941, Hegeman was named district manager, a position he has held ever since.

F. H. HAYES

A. K. HEGEMAN

Hayes and Hegeman will continue to make headquarters at the same addresses in Houston and Los Angeles as they have in the past.

WILDCAT COMPLETIONS

(Continued from page 172)

Stanton County: Huber Corp. 1 Kilgore, C NE SW 5-30s-42w. Dry. TD 5,627 ft.

NEBRASKA

Cheyenne County: British-American Oil Producing Co. 1 Meier, C NW NW 1-12n-51w. Dry. TD 5,121 ft.

Kimball County: Empire Drilling Co. 1 Hume-A, NW NW SE 15-13n-54w. Dry. TD 6,070 ft.

1 Cabella, NE NE NW 29-13n-54w. Dry. TD 6,208 ft.

Tom Palmer, Inc. 1 Chaney, SW SW SW 27-13n-57w. IPP 240 BOPD, "D" sand discovery, new field. TD 7,081 ft.

1 State-A, SE SE NW 36-13n-57w. Dry. TD 6,987 ft.

James P. Sloss 2 State, C NW NW 36-14n-55w. IPP 142 BOPD, "J" sand discovery, new field. TD 6,228 ft.

SOUTH DAKOTA

Jones County: Shell Oil Co. 1 Herman, NW SW 15-1n-29e. Dry. TD 2,576 ft. Pre-Cambrian.

NORTH DAKOTA

Dunn County, Carsin: Carter Oil Co.-Sinclair-Socony-Vacuum Oil Co. 1 Lockwood, C SE SW 5-147n-93w. Temp. abd. TD 11,104 ft. Jefferson.

Stutsman County: Calvert Exploration Co. 1 Robertson, NE NE 26-138n-67w. Dry. TD 3,682 ft. Cambrian.

CALIFORNIA

Kern County: Los Nietos Co. 63-19 Sumpf, 19-25s-20e. Dry. TD 4,923 ft.

Moriqui Exploration Co. 82-32 Dougherty, 32-12n-24w. Dry. TD 3,947 ft.

Reserve Oil & Gas Co. 28-23 Reserve, 23-11n-19w. Dry. TD Olcese Sand 5,698 ft., TD 5,824 ft.

Kings County: Seaboard Oil Co. 22-G Gibson, 22-22s-19e. Dry. TD 4,000 ft.

Los Angeles County: Continental Oil Co. 1 McCue USL, 15-7n-18w. Dry. TD 6,430 ft.

Orange County: Hamilton & Sherman 54-10 Union Stewart Fee, 10-3s-10w. Dry. TD 8,026 ft.

Santa Barbara County: Union Oil Co. A-13 Escolle, 34-9n-34w. Dry. TD 6,094 ft.

Union Oil Co. 28-12 Jesus Maria, 12-8n-35w. Dry. TD 4,174 ft.

WASHINGTON

Grays Harbor County: Continental Oil Co. 1 City of Hoquaim, 3-18n-10w. Dry. TD 3,737 ft.

MONTANA

Teton County, Acme Prospect: H. B. Zachry Co. 1 Kooyman, C SE SE 2-24n-3w. Dry. TD 1,723 ft. Madison.

WYOMING

Fremont County, Lost Cabin: H. O. Batzer 1 Spratt, NE SW NW 3-38n-90w. Dry. TD 2,015 ft.

Hot Springs County, Skelton Dome: Mobil Producing Co. f-22-32-G, C SE NW 32-45n-99w. IP 1,150 M.c.f. of gas per day, third Frontier discovery, new field. TD 7,030 ft.

Natrona County, East Teapot: Martin Bertagnole 1 Government, NW SE NE 11-38n-78w. Dry. TD 2,170 ft. Second Wall Creek.

Niobrara County, East Lusk: Continental Oil Co. 1 Arnold, SE NE NW 35-33n-62w. Dry. TD 2,518 ft. Morrison.

Park County, Ralston: Sun Oil Co. 1 Unit, C NE NW Tract 51-56n-101w. IPF 252 BOPD, Phosphoria discovery, new pay. TD 13,299 ft. Madison.

Sublette County, Reservoir Project 67: General Petroleum Corp. 63-X-21 Bar Cross, NE SW NE 21-30n-112w. Dry. TD 8,270 ft. Baxter.

Sweetwater County: Six Mile Springs, The Chicago Corp. 1 Government, C SW NW 26-18n-104w. Dry. TD 4,671 ft. Nugget.

Buckhorn Unit: General Petroleum 67-28, NE SW SE 28-25n-109w. Dry. TD 8,205 ft. Baxter.

UTAH

Grand County, Southeast Cisco: L. H. Stierwalt et al 1 Government, NW SE SW 34-21s-24e. Dry. TD 1,455 ft. Chinle.

Ed Butler 1 Government, NE NW NW 22-22s-23e. Dry. TD 420 ft. Morrison.

COLORADO

Adams County: R. W. Walker 1 Hepper-Miller, Inc., SW SW SW 8-1s-57w. Dry. TD 5,908 ft.

S. D. Johnson and Cosden Petroleum Corp. 1 Rosener, SE SE SW 12-1s-59w. IPP 180 BOPD, "D" sand discovery, new field. TD 6,282 ft.

Arapahoe County: Sinclair Oil & Gas Co. 1

Gerstenberger, NE NE NE 8-5s-59w. Dry. TD 6,244 ft. Skull Creek.

Adams County: Ryan & Davis and Potter Co. 1 Knox, SW SW SE 35-1s-59w, IPF 480 BOPO, "D" sand discovery, opens Knox field. TD 6,313 ft.

El Paso County: Sinclair 1 Lewis, NW NW NW 2-14s-65w. Dry. TD 7,600 ft. Skull Creek.

Logan County: Balderson Denver Drilling Co. and Wise 1 State, SW SW NE 15-8n-54w. Dry. TD 5,220 ft.

J. Ray McDermott and Barnhart 1 McRoberts, C SE SW 21-10n-54w. Dry. TD 5,307 ft.

Morgan County: B. F. Allison Drilling Co. 1 State, NE NE NE 8-2n-57w. Dry. TD 5,605 ft.

1 Dillie, C NE SW 24-5n-58w. Dry. TD 6,040 ft.

Braden-Hoover-Kejr 1 Wells Hunt, SW SW NW 31-1n-58w. Dry. TD 6,235 ft.

Bridwell Oil Co. 1-16 State, SE SE SW 16-2n-57w. Dry. TD 5,600 ft.

Cosden 1 Cook, C SW NE 32-5n-60w. Dry. TD 6,426 ft.

Gem Oil Co. and V. H. Simmons 1 Peterson, C NE NW 10-2n-60w. Dry. TD 6,479 ft.

H. L. Hunt 5 George E. Huey et al, C NE SE 19-2n-56w. Dry. TD 5,305 ft.

G. L. Reasor 1 Whittington, SE SE SW 2-5n-58w. Dry. TD 6,185 ft.

Sanford Production 1 ePters, SE SE NE 14-1n-55w. Dry. TD 5,063 ft.

Washington County: McMahon-Bullinton Drilling Co. 1 Lanning, C Lot 1, Sec. 1-4n-54w. Dry. TD 5,055 ft.

Plains Exploration Co. 1 Blake, NW NW SE 21-1s-55w. Dry. TD 4,980 ft.

Weld County: Tom Palmer 1 Will, C NW SW 3-6n-62w. Dry. TD 7,301 ft.

SASKATCHEWAN

Socony-Sohio 11-2 South Buttress, LSD 2, 11-14-28w2. Dry. TD 4,670 ft.

Hudson's Bay-Canada Southern 5 Denzil, LSD 2, 2-39-25w3. Dry. TD 2,572 ft.

Amurex-Canada Southern 1-11 Babitzke, LSD 11, 16-16-28w3. Dry. TD 3,490 ft.

Shell A4-22 Innes, LSD 4, 22-7-11w2. Dry. TD 4,707 ft.

Socony-Woodley-Southern 33-12 Southwest Midway, LSD 12, 33-14-20w3. Dry. TD 3,555 ft.

Socony-Woodley-Southern 4-6 Pennant, LSD 6, 4-18-16w3. Dry. TD 3,470 ft.

Socony-Sohio 21-5 Totnes, LSD 5, 21-28-18w3. Viking gas well. TD 2,406 ft.

ALBERTA

Hudson's Bay 12-26 Codner, LSD 12, 26-39-6w5. Dry. TD 6,554 ft.

Cleary 2 Driedmeat, LSD 13, 25-45-20w4. Viking oil well. TD 3,180 ft.

Merrill-Sun 1-35 Eyremore, LSD 1, 35-17-17w4. Dry. TD 3,651 ft.

Canadian Export Gas-Ohio MidCon 6-7-23-17 Gem, LSD 6, 7-23-17w4. Indicated Madison oil well. TD 5,125 ft.

Cal-Standard 8 Grassy Island Lake, LSD 11, 14-34-8w4. Dry. TD 2,940 ft.

Bay 16 Shermak, LSD 16, 15-46-20w4. Viking oil well. TD 3,337 ft.

Homestead Territories 3 Kinmundy, LSD 11, 1-25-9w4. Dry. TD 2,960 ft.

Seaboard-Hudson's Bay et al "B" 10-26 Buck Lake, LSD 10, 26-45-7w5. Cardium oil well. TD 6,600 ft.

Canadian Export 11-7 Rolling Hills, LSD 11, 7-15-13w4. Dry. TD 3,532 ft.

Socony-CPR 36-7 Rosebud, LSD 7, 36-27-21w4. Dry. TD 4,761 ft.

British American-Hudson's Bay 10-8 Sage Creek, LSD 10, 8-2-1w4. Jurassic gas well. TD 3,949 ft.

Hudson's Bay-Union 5-33 Liberal, LSD 5, 33-68-22w5. D3 oil well. TD 8,800 ft.

Stanolind "A" 1 Winchell Coulee Crown, LSD 7, 2-30-6w5. Dry. TD 11,222 ft.

TEXAS

(Continued from page 154)

the bay, about 7½ miles northeast across the bay from Texas City.

New Vicksburg Production Spreads at Blue Ridge

Recently discovered Vicksburg production in the North Blue Ridge area, south of Houston, has been extended farther northward into Harris County. Extension well, 1 Sakowitz, drilled by C. J. Brown, flowed 140 bbl. of 40.5°-gravity oil per day through ⅛-in. choke with tubing pressure of 975 psi. and gas-oil ratio of 680 cu. ft. per barrel. Pay interval is 7,801-04 ft. Other production at Blue Ridge is on the Fort Bend County side of the line. Brown is starting another Vicksburg well 933 ft. to the northeast around the north flank of the dome.

SOUTHWEST TEXAS

Second Well Confirms New Buda Oil Discovery

Harry Henderson's recent discovery of Buda lime production in the Kingsbury area, in Guadalupe County, has been confirmed in the operator's second well, completed with a flow of 115.85 bbl. of 18.5°-gravity oil per day through $\frac{3}{16}$-in. choke. Flowing pressure gaged 100 psi. on the tubing and 600 psi. on the casing. Gas-oil ratio was 400 cu. ft. per barrel.

The new well, 1 Imhoff, west offset to the discovery well, has the Buda pay at 2,036-64 ft. (casing perforations). Discovery well, 1 Schmidt, completed last month, produces from perforated interval at 2,070-2,103 ft. It had a flow of 193.8 bbl. of oil per day through ¼-in. choke.

The wells are located ¼ mile northeast of the Kingsbury townsite.

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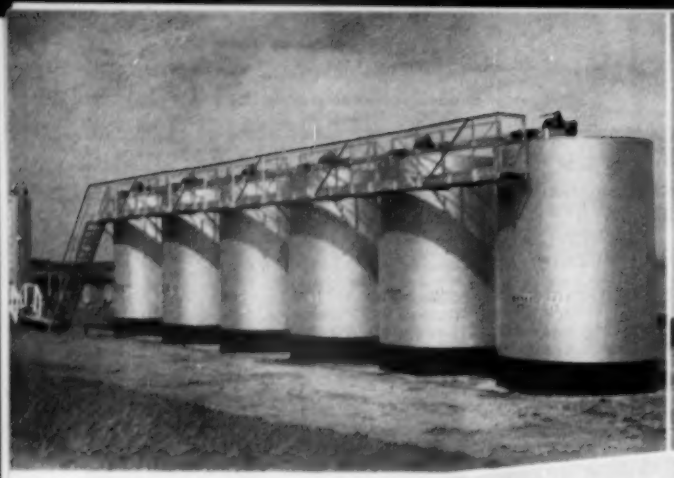

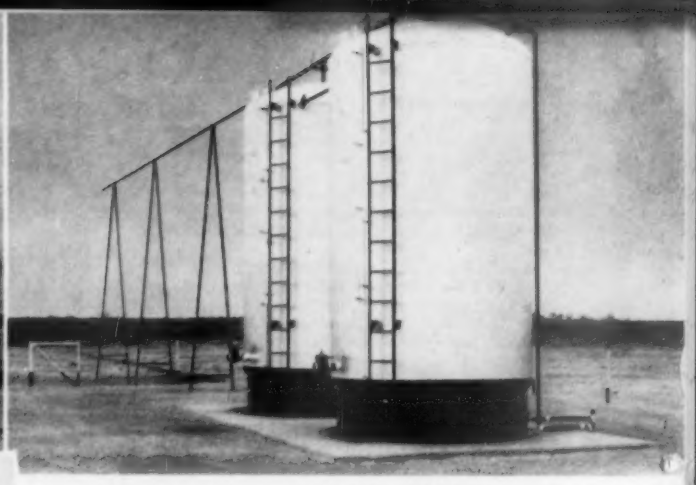

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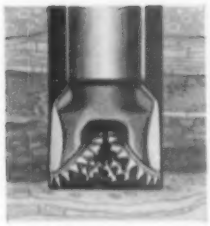

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